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AGRICULTURAL APPROPRIATION BILL, 1923

HEARING

BEFORE

SUBCOMMITTEE OF HOUSE COMMITTEE
ON APPROPRIATIONS

CONSISTING OF

MESSRS. SYDNEY ANDERSON (CHAIRMAN), WALTER W. MAGEE,
EDWARD H. WASON, JAMES P. BUCHANAN,
AND GORDON LEE

IN CHARGE OF THE

AGRICULTURAL APPROPRIATION BILL FOR 1923

STANFORD UNIVERSITY
DOCUMENT DEPARTMENT

SIXTY-SEVENTH CONGRESS
SECOND SESSION

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1922

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HOUSE OF REPRESENTATIVES.

SIXTY-SEVENTH CONGRESS, SECOND SESSION.

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AGRICULTURAL APPROPRIATION BILL, 1923.

HEARINGS CONDUCTED BY THE SUBCOMMITTEE (MESSRS. SYDNEY ANDERSON (CHAIRMAN), WALTER W. MAGEE, EDWARD H. WASON, JAMES P. BUCHANAN, AND GORDON LEE) OF THE COMMITTEE ON APPROPRIATIONS, HOUSE OF REPRESENTATIVES, IN CHARGE OF THE AGRICULTURAL DEPARTMENT APPROPRIATION BILL FOR THE FISCAL YEAR 1923, ON THE DAYS FOLLOWING, NAMELY:

MONDAY, JANUARY 30, 1922.

OFFICE OF THE SECRETARY.

ADDITIONAL EMPLOYEES—INCREASES IN SALARIES.

STATEMENTS OF HON. HENRY C. WALLACE, SECRETARY OF AGRICULTURE; MR. C. W. PUGSLEY, ASSISTANT SECRETARY OF AGRICULTURE; MR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK; AND MR. R. M. REESE, CHIEF CLERK.

Mr. ANDERSON. Suppose we take up the Secretary's roll and hear Mr. Reese on the items of salaries on page 3. I suppose the item for the Assistant Secretary, director of scientific work, and the director of regulatory work will be taken up by the Secretary?

Mr. REESE. I understand so.

Mr. ANDERSON. Your first change is "executive clerks"—one $2,500; three at $2,250 each, in lieu of one at $2,250, and one at $2,100.

Mr. REESE. An increase is estimated for one now getting $2,100——

Mr. ANDERSON. Were these salaries increased last year?

Mr. REESE. No.

Mr. ANDERSON. This means an addition of two.

Mr. REESE. Yes.

Mr. ANDERSON. And the increase of one from $2,250 to $2,500, and an increase of three to $2,250?

Mr. REESE. An increase of one from $2,100 to $2,500, and two new ones at $2,250.

Mr. ANDERSON. All right. And these are executive secretaries for the new places, or executive secretaries for the directors of regulatory and scientific work?

Mr. REESE. Yes.

Mr. ANDERSON. Your next change?

Mr. REESE. The next change is one inspector, from $3,000 to $3,500. This has been recommended several times before, and what has been said about it in the past applies to it now. He has had more than 20 years of service in the department, and is very deserving of promotion. My statement of last year on this officer was as follows:

> This is the officer who conducts investigations in personnel cases for the Secretary. During the past calendar year 223 bureau investigations, resulting in recommendations for disciplinary action by the Secretary, were carefully reviewed and forwarded to the Secretary with appropriate recommendations, in addition to which original investigations were conducted in 99 cases. A number of these cases involved the drafting of formal charges and the consideration of the answers thereto. Seventy special investigations were also made of the fitness of prospective employees for appointment. Requests for approximately 150 authorizations for permission to do outside work were given appropriate consideration.
>
> The same officer reviews the fiscal papers of the Secretary's office, and has one section under him, known as the transportation section, which deals with the transportation requests of the department and the transportation accounts—passenger, freight, and express. That has been a large amount of work.

Secretary **Wallace**. I would like to say a word about that. That office is becoming more and more important, and is entitled to carry the increase in salary.

Mr. **Reese**. There is a recommendation for an increase of $500 in salary for the superintendent of telegraph and telephones. He is now receiving $2,000. The same argument applies: The man is of long service in the department; I think he has the best telephone office in Washington, without any doubt, managing both the telephone and telegraph work with conspicuous ability.

He acts in a triple capacity. He directs the telegraph and telephone work of the department, and in addition to that he is now conducting an audit of the accounts for telegraph and telephone service. His position is not exactly comparable to any other that I know of in the Government service, but in the Government service there are telegraphers alone who are paid salaries as high as $1,800; and in the Western Union Telegraph Co. men holding comparable positions—say, for example, supervisors of telegraphers—are paid an average salary of $195 a month. This man's salary for all three functions is $166 a month. The Civil Service Commission has held an examination for telephone auditor at a salary of from $2,000 to $2,400 a year. In telephoning alone, the Chesapeake & Potomac Telephone Co. pays its traffic chiefs from $200 to $300 per month. I wish to make it clear that this man is now discharging the triple function of telegraph and telephone supervisor and auditor, and doing it very well, at a salary of $2,000 per annum.

Mr. **Anderson**. Was this asked for last year?

Mr. **Reese**. Yes.

Secretary **Wallace**. Will you please excuse me, Mr. Chairman?

Mr. **Anderson**. Certainly. I will arrange for you to be heard when all of the committee are here.

Mr. **Reese**. There is a further recommendation for the promotion of the assistant chief clerk, an increase of $200. He serves in the dual capacity of my assistant and captain of the watch. He is on duty at any hour of the day or night, or subject to call. His duties and responsibilities fully justify a salary of $2,000, in my judgment, and I so recommend.

I will have to go back to the solicitor's force, where our recommendation is made for the dropping of two law clerks at $1,800.

Mr. **Anderson**. That means an actual decrease in that force?

Mr. **Reese**. That means an actual decrease in that force. There is one other small change in that roll.

Mr. **Anderson**. Take up the item at the bottom of the page, where you change eight messengers or laborers to six at $600.

Mr. **Reese**. Two are dropped, laborers at $600.

Mr. **Anderson**. You drop two messenger boys at $600?

Mr. **Reese**. Messengers or laborers.

Mr. **Anderson**. On page 4.

Mr. **Reese**. There is a transfer of one messenger boy at $720. He has been transferred from the Secretary's roll to the Division of Publications, and one, at $480, has been transferred to the Division of Publications.

Mr. **Anderson**. What was the reason for that transfer?

Mr. **Reese**. It developed from the fact that the boys were serving that way on detail some time back, and this is simply to adjust the roll to meet the facts.

MECHANICAL SHOPS AND POWER PLANT.

Mr. **Anderson**. The next item is salaries and compensation of employees in the mechanical shops and power plant.

Mr. **Reese**. The amount estimated for 1923 is the same. The matter in italics is a repetition of a recommendation made last year which *went out* on a point of order. The argument for the arrangement is the same. The principal benefit to be derived is to arrange it so the bureaus pay for the work they get done in the mechanical shop.

The law, if enacted, will provide that the Secretary of Agriculture may, by transfer settlement through the Treasury, reimburse any appropriation made for the salaries and compensation of employees in the mechanical shops of the department from the appropriation made for the bureau, office, or division for which any work in said shops is performed, and such reimbursement shall be at actual cost of such work for supervision and labor. Such reimbursement will be for work of a scientific and technical nature which the mechanical shops can perform better and more cheaply than commercial concerns. If performed by commercial concerns, the bureaus would have to pay for it from their appropriations. On the other hand, if performed by the mechanical shops without reimbursement, it is obvious that bureau appropriations properly chargeable for this work would be increased.

Mr. **Anderson**. That would be an additional appropriation, would it not?

Mr. **Reese**. No. What we are actually doing now is securing reimbursement from the bureaus for the shop labor that is performed on their specific lines of work—that is to say, on the technical and scientific apparatus. The language provides that reimbursement shall be made for the amount of such work performed for them.

Mr. **Anderson**. How much has been reimbursed in that way during the current year so far?

Mr. **Reese**. For the current year it will be $25,000 or thereabouts.

Mr. **Anderson**. Under the pending provision about how much would be reimbursed?

Mr. **Reese**. About the same amount each year.

Mr. **Anderson.** No more than that?

Mr. **Reese.** I do not think so. We are only halfway through the year; but, based on the first six months, I do not think reimbursements will exceed that amount.

Mr. **Anderson.** How is the material involved in this repair work provided for?

Mr. **Reese.** The department has had authority to secure reimbursement for material since 1913.

Mr. **Anderson.** That is done under the reimbursement basis, the same way you propose to do this labor work?

Mr. **Reese.** Yes.

Mr. **Anderson.** Would it make any reduction in the appropriation?

Mr. **Reese.** No; I think not. We argued last year on this provision, that it would make it possible, among other things, to promote the shop force which at that time was seriously underpaid, and it has done that. It has allowed us to promote the mechanics at or about the scales where they ought to be. A proportion had been raised to salaries corresponding with the salaries of the men of the navy yard of the same craft—not all, because there was not enough money.

Mr. **Anderson.** The testimony last year was that there was no suggestion about making an increase in salaries.

Mr. **Reese.** I think I can show you that is the testimony of last year. (See pp. 15, 16, hearings agricultural bill, 1922.)

Mr. **Anderson.** Does that proviso make an increase?

Mr. **Reese.** There will be $100,000.

Mr. **Anderson.** You have more than $100,000.

Mr. **Reese.** And the amount of reimbursements that we may secure.

Mr. **Anderson.** I should like the figure on the amounts reimbursable this year and I should like an estimate on the amount for the current year.

Mr. **Reese.** It is estimated $25,000 will cover reimbursements in any year.

MISCELLANEOUS EXPENSES.

PURCHASE OF AUTOMOBILE FOR SECRETARY.

Mr. **Anderson.** Your next item on page 7, "Miscellaneous expenses."

Mr. **Reese.** That is the same verbiage with the exception of the italics in the last three lines, "of which not to exceed $3,500 shall be immediately available for the purchase of an automobile for the official use of the Secretary of Agrculture."

Mr. **Anderson.** Is there any provision for the maintenance of that automobile?

Mr. **Reese.** It would be maintained out of the general fund. It would be maintained in place of the carriages and horses we have now.

Mr. **Anderson.** Is there any provision for the dispesal of the horses?

Mr. **Reese.** We have general authority to disopse of them through the General Supply Committee. As a matter of fact, certain of the horses that we have will be utilized on the farms at Beltsville and

Arlington. The carriages we can only dispose of through the General Supply Committee for whatever can be had for them.

Mr. **Anderson.** If the horses will be absorbed there will be no actual saving. It will cost something to maintain them?

Mr. **Reese.** The farms need the horses, and they will have to buy new horses if they do not take ours.

Mr. **Anderson.** I wish you would file with your testimony a statement of what can be saved by this item, and if any legislation is necessary in order to dispose of those horses and carriages, I would like to have such provision.

Mr. **Ball.** The automobile will be furnished from the War Department supply on hand, but will be paid for out of this fund at a very much reduced price.

STATEMENT ON PURCHASE OF AUTOMOBILE FOR SECRETARY AND DISPOSITION OF HORSES AND CARRIAGES.

If the increase is allowed the automobile will be purchased from the War Department, where it is understood to be available, as soon as the Conference on Limitation of Armament comes to an end.

If this automobile is secured, 8 of the 11 horses now in the department stables will be disposed of, as follows:

Five to the Arlington farm, where four horses have recently been considered by a board of survey, condemned, and destroyed. When spring work opens, all five of these horses will be urgently needed on the Arlington farm.

One horse to the Beltsville farm to replace an old mule now worn out and about to be condemned.

Two Morgan horses which were brought to Washington from the department's Morgan-horse farm at Middlebury, Vt., will be returned to this farm, where they will be used in connection with the experimental work being carried on there in the development of the Morgan horse.

Three draft horses will be retained for the use of the Bureau of Plant Industry in maintaining the department grounds.

The four carriages now in use will be turned over under present procedure to the General Supply Committee for sale.

It is estimated that by the use of an automobile and the disposition of horses and carriages outlined above an annual saving of $2,540.40 can be effected.

Present cost of operating carriages.

Forage (based on cost last fiscal year)		$2,173.61
Miscellaneous supplies (based on cost last fiscal year)		160.09
Repairs to carriages (based on cost last fiscal year)		86.70
Total		2,420.40
Salaries:		
1 foreman of stables	$1,080.00	
1 skilled laborer (driver)	1,000.00	
2 unskilled laborers (1 driver and 1 hostler, at $840 each	1,680.00	
		3,760.00
Total		6,180.40

Estimated cost of proposed automobile service.

Estimated cost of gas, tires, and repairs		$1,200.00	
Estimated cost of feeding 3 horses, which it will be necessary to retain for the Bureau of Plant Industry for work on grounds		600.00	
Salaries:			
1 chauffeur	$1,000.00		
1 chauffeur	840.00		
		1,840.00	
			3,640.00
Estimated saving in cost of vehicle service			2,540.40

Does not include the saving of the $240 bonus which all the above employees receive.

While the above statement shows an estimated saving in miscellaneous expenses and basic salaries amounting to $2,540.40, this amount should not be dropped from our appropriations, except the salary of the foreman of stables, $1,080.

If the appropriation for the automobile is granted, the foreman of stables can be transferred to another branch of the Secretary's office to a vacancy which will occur in the early spring owing to the resignation of an employee.

The place of skilled laborer at $1,000 is filled by a colored man who has driven the various Secretaries of Agriculture since 1897. His place should be retained in the bill and his services utilized in some other line of work when a vacancy occurs.

The two unskilled laborers at $840 each (one a driver of several former Secretaries and the other a relief driver and hostler) should have their places retained in the bill and their services utilized in some other branch of the department when vacancies occur. All of these men are employees of long and faithful service and to discharge them now would cause serious hardship.

RENTAL OF BUILDINGS IN DISTRICT OF COLUMBIA.

Mr. **Anderson.** In your next item on page 9, rental of buildings, there is an apparent decrease of $5,000.

Mr. **Reese.** There is an actual decrease in the item as estimated, but there is a supplemental estimate coming in. The estimate in this bill, made up at the time when that was apparently correct, is reduced $5,000. Recent developments in regard to the Forest Service Building, and the proposed motion-picture laboratory, which the department so much needs, make it necessary to prepare and submit a supplemental estimate which has gone to the Budget Bureau.

Mr. **Anderson.** Which do you drop?

Mr. **Reese.** The Busch Building on E Street. That was dropped the 1st of July, and the people transferred to Building F.

Mr. **Anderson.** What additional estimate has been submitted?

Mr. **Reese.** $22,200.

Mr. **Anderson.** What does that cover?

Mr. **Reese.** That covers the increase of rental on the Forest Service Building, $12,200, specifically authorized by the Public Buildings Commission.

Mr. **Anderson.** When does that begin?

Mr. **Reese.** The 1st of next July.

Mr. **Anderson.** All right.

Mr. **Reese.** It covers $6,000 to make up the necessary amount to pay rental on the motion-picture laboratory, which is an essential thing for the department, and an increase of $4,000 for the rental of the large building occupied by the States Relation Service, at 220 Fourteenth Street. That building has been under lease continuously for 10 years, at the rate of $20,000.

Mr. **Anderson.** That is an increase?

Mr. **Reese.** Yes, sir; an increase. The owner refuses to lease it again except at $4,000 increase; even this increase will leave a very moderate rental, as such things go. The rate per square foot will be 43 cents.

MOTION-PICTURE LABORATORY.

Mr. **Anderson.** Where is this motion-picture laboratory?

Mr. **Pugsley.** May I say a word about this? The motion-picture laboratory is now in the basement of the Bureau of Markets Building, and all the work is done in the basement, with poor light, greatly detrimental to the health of the workers. We have to carry the films through the library and store them in a vault under the front entrance for storage. The storage of films there is dangerous, to say the least, although the vault is fairly well ventilated. If there should be an explosion or fire the results might be disastrous, for the vault is under the steps of a building housing 600 workers. Mr. Reese has been asked to find a place for a new motion-picture laboratory. No suitable Government building being available, the first house available for a new one has the approval of the Public Buildings Commission. I am informed that the attention of the department has been called twice to the danger of having storage vaults under the steps of the building, although I believe that the ventilation of the present place met with the approval of the fire commissioners until a better place could be provided. I consider it very essential to find a new place.

Mr. **Anderson.** Where is the new place?

Mr. **Pugsley.** The building of a new building adapted to motion-picture work located in the near neighborhood, if possible.

Mr. **Anderson.** Will that have to be constructed by private persons?

Mr. **Reese.** Yes; that is the only way to get it done. We have two or three proposals, and one now from a man who can do it.

Mr. **Anderson.** What is the cost of the building?

Mr. **Reese.** The cost to the department will be $10,000.

Mr. **Anderson.** What will the cost of the building be?

Mr. **Reese.** I do not know.

Mr. **Anderson.** You must have had some idea if you agree to a rental of $10,000.

Mr. **Reese.** One architect thought it would cost $45,000, another guessed $60,000, and I presume, in view of the present uncertainty of prices, that is as close as they can come to it.

Mr. **Pugsley.** The building is to house not only motion pictures but other photographic work scattered in four or five different places, a very inefficient sort of arrangement.

Mr. **Anderson.** Where is the building located?

Mr. **Pugsley.** The original plan was to locate it near the Division of Publications, on Twelfth and C Streets.

Mr. **Anderson.** Southeast or southwest?

Mr. **Pugsley.** Southwest. The time that would be saved, and saving on duplication of material, the greater safety and the removal of menace to the health of the people working in the basement would make the rental of the building appear as a very small amount.

Mr. **Anderson.** Can you state offhand what the total cost of producing the motion-picture activities in the department is?

Mr. **Pugsley.** I can not state. I can get that for you.

Mr. **Anderson.** That completes the roll, unless there is something else.

REFRIGERATING PLANT.

Mr. **Reese.** There is one more item that I am interested in, the revival of the proposition to build a place outside of the building for a refrigerating plant.

Mr. **Anderson.** Where is that?

Mr. REESE. That is under "miscellaneous," at the end. Perhaps I do not need to delay the committee on that, as it will be discussed by the Bureau of Animal Industry.

Mr. ANDERSON. Tell us about it.

Mr. REESE. We have a refrigerating plant now in the subbasement of the white marble building, the east wing. It is a bad place for it, for much the same reason that the motion-picture laboratory is in a bad place. An ammonia pipe may burst at any time and fill the basement up with ammonia fumes, to the risk of the people down there and to the risk of the mechanic going down to repair it. The place is damp, and is not good for the apparatus itself. We propose to construct it outside of the building, underground, but so ventilated that it would not be as damp as it is where it is now. My main desire to get the thing out is the risk. It may break down. It has once or twice given us trouble with ammonia fumes, and I do not think it right to risk sending a mechanic down, to perhaps smother him in ammonia. I think the Bureau of Animal people will indorse this very strongly, because it is their apparatus, subject to break down on them all the time.

Mr. ANDERSON. How long has that apparatus been in there

Mr. REESE. Eight or 10 years. The building has been in use 14 years. I do not know how soon this apparatus was installed. It is probably 8 or 10 years since it has been in there. Dr. Mohler will speak further on that.

Mr. ANDERSON. Have you anything further, Mr. Reese?

Mr. REESE. I have nothing further; no.

JANUARY 30, 1922.

BUREAU OF ANIMAL INDUSTRY.

STATEMENTS OF DR. JOHN R. MOHLER, CHIEF OF THE BUREAU OF ANIMAL INDUSTRY; DR. C. W. LARSON, CHIEF OF THE DAIRY DIVISION; AND MR. E. W. SHEETS, ACTING CHIEF OF THE ANIMAL HUSBANDRY DIVISION.

Mr. ANDERSON. We will take up the item on page 21, Bureau of Animal Industry. The first change in your salary roll is chief of bureau, from $5,000 to $7,500. You do not want to talk about that?

Dr. MOHLER. No, sir.

EXECUTIVE CLERK—ILLUSTRATOR.

Mr. ANDERSON. Then there is a reduction of one executive clerk, from eight to seven, at $2,000 each.

Dr. MOHLER. This reduction of one executive clerk is more apparent than real. It is a transfer of one man from the Bureau of Animal Industry to the Division of Publications, on account of our combining all multigraphing work of the department into one office. This clerk has been assigned by the bureau to this other office, to help take care of the multigraphing work.

Mr. ANDERSON. Does that mean a transfer that has been made this year?

Dr. **Ball.** Yes, sir; a transfer that has been made.

Dr. **Mohler.** You will find that the consolidation of this work has resulted in a great saving of money, and this is one item of a number of items that will come up. The same explanation will cover the case of the illustrator, at $1,400. This position has been transferred to the Division of Publications in a similar manner, so that more illustrating work may be done by the Division of Publications.

Mr. **Anderson.** They are the only changes?

Dr. **Mohler.** They are the only changes in the statutory roll.

Mr. **Anderson.** No change in your general language on page 23 or 24?

Dr. **Mohler.** No, sir; the language is identical with previous years.

INSPECTIONS AND QUARANTINE WORK.

FOR ERADICATION OF SCABIES IN SHEEP AND CATTLE.

Mr. **Anderson.** The next item is on page 25, for inspection and quarantine work, including all necessary expenses for the eradication of scabies in sheep and cattle, the inspection of southern cattle, etc.

Dr. **Mohler.** The item on page 25, Mr. Chairman, is precisely the same as it was last year. It covers our general inspection and quarantine work in the field, as noted in that paragraph.

Mr. **Anderson.** Is that expense for the eradication of scabies a continuing proposition?

Dr. **Mohler.** The work is not supposed to be a continuous one, but it has continued for the last 14 years. We had reduced scabies of cattle and sheep tremendously until the war came on. During the war the small amount of labor put on this work, due to reduction in man power, allowed the disease to recur in a number of States, but during the last 12 months we have started to get hold again, much more so than during the war period. Besides, we had to contend with the three years of drought in the Great Plains section, from Montana to New Mexico and Arizona. There was not enough water for the animals to drink, to say nothing of immersing the animals to get rid of the infection, so we have had several years of marking time, because of the drought in those sections.

Last year we made very good headway, and, outside of New Mexico, Texas, California, western Kansas, Nevada, and Oregon, there has been a great reduction in scabies. In fact, the situation today in regard to scabies of cattle and sheep is much better than during the last four years.

Mr. **Anderson.** I do not recall about this work.

Dr. **Mohler.** This is done cooperatively with the secretary or the commissioners of Agriculture in the various States. We trace infested sheep from the stockyards to the ranches, or the farms where they originate, and the State puts on quarantines, and compels the owners to submit their animals to the dipping process.

Mr. **Anderson.** What part does the Government do or pay for?

Dr. **Mohler.** We pay for the inspection, which includes salaries and traveling expenses. The office at Denver, Colo., covers Colorado and Wyoming; the one at Albuquerque covers Arizona and New Mexico. The office at Salt Lake City covers Utah and Nevada, and we have another one in Walla Walla, Wash., for the Northwest section. Each office has a number of inspectors scattered about the State, who virtually act as range riders, and when these men go out for the round-up, or for shearing inspection, or in fact at any other time, and find infected sheep or cattle, they serve notice, and these animals are dipped. There is a part of the work included in the inspection of cattle and sheep going on or off the forest reservations. We do that every spring and fall with the sheep, in cooperation with the Forest Service, and no animals of any kind go on the reservations if they are infected. That amounts to a considerable portion of the work and of the expense in the field.

Mr. ANDERSON. Is this range riding done under this appropriation?

Dr. MOHLER. Under this appropriation, such as is done by the Federal Government. The States are cooperating, and they have a number of inspectors, but they are not covering the same ground or duplicating our work. They allot different areas to different inspectors.

Mr. BUCHANAN. I understand that Government employees, called inspectors, actually ride the ranges, hunting out scabies in cattle and sheep?

Dr. MOHLER. During the round-up season they ride just like cow boys, and stay with the outfits, to round-up these exposed or infested animals until the round-up is over.

Mr. BUCHANAN. They just justify the owner and dip under State authority or voluntarily?

Dr. MOHLER. The stockmen usually are glad to have the infection discovered, if it is present, and they dip voluntarily. If they do not, the State serves notice. We have no compulsory powers.

Mr. BUCHANAN. You could not have.

Dr. MOHLER. Except in an interstate shipment to market, and then our authority comes in, but as a rule, these men will dip voluntarily. They know it is bad to keep infected animals on the range as the disease spreads quite rapidly.

Mr. BUCHANAN. There is a lot of contention in some States about it.

Dr. MOHLER. That is mostly on the tick situation, which is not within five years of being so far advanced as the dipping for scabies in sheep and cattle.

Mr. MAGEE. What is the nature of this?

Dr. MOHLER. It is a parasitic skin infestation, by a little mite that burrows into the skin, and causes loss of wool in sheep and depreciates the value, by producing anemia and shrinkage in weight in both sheep and cattle.

Mr. MAGEE. Is it contagious?

Dr. MOHLER. Yes, sir.

Mr. MAGEE. What part of your appropriation does sheep scabies take for this year?

Dr. MOHLER. The expenditure for the six months of this fiscal year amounted to $60,974.03, but the eradication of sheep scabies last year cost $150,292, against an allotment of $156,378, which was made. We spent all but $6,086 of the allotment.

Mr. ANDERSON. What year was that?

Dr. MOHLER. The fiscal year of 1921, just passed.

Mr. **Anderson.** It states here the appropriation that year was $519,640.

Dr. **Mohler.** That is true for all inspection and quarantine work, but not solely for the eradication of sheep scabies. This is only one project under the big item. We have in addition the cattle and horse scabies, interstate transportation of live stock, inspection of southern cattle, and several smaller projects. They come together to make the big item of $519,640.

Mr. **Anderson.** Did you state how much was used for the six months of this appropriation?

Dr. **Mohler.** We have the amount used during the whole 12 months of the last fiscal year of this entire appropriation.

Mr. **Anderson.** Did you use it all?

Dr. **Mohler.** Yes, sir. Would you like to have me figure that up? I can do it in a moment.

Mr. **Anderson.** If you have it convenient.

Mr. **Magee.** Is there any particular time of the year when you use more of the appropriation than any other time?

Dr. **Mohler.** Yes, sir; you can not do much work after November out there in the Rocky Mountain section. The greatest amount of work starts in April and goes through until the weather prevents dipping, somewhere around the latter part of November.

Mr. **Magee.** What do they dip in?

Dr. **Mohler.** We give the owner a preference in dipping, either in nicotine or lime and sulphur. That is for the scabies.

Mr. **Magee.** Take cattle—how do you treat the cattle?

Dr. **Mohler.** In the same way; the fight is against the same character of mite, so we use either the nicotine or lime and sulphur dip. In some places we are experimenting on crude petroleum oil, like in Wyoming, where there is oil immediately available.

Mr. **Magee.** Is one dip sufficient for a season?

Dr. **Mohler.** No, sir; two dips are required, 10 to 14 days apart, and that generally is sufficient. We allow the animals to come to slaughter after one dip, without any restriction, but to clear up the disease double and sometimes triple dipping is required, about 10 days apart.

Mr. **Anderson.** Are you getting control of the scabies situation?

Dr. **Mohler.** Yes, sir; we were. It is in better shape than it has been since 1917. Last year we had considerable trouble with it, because of a large number of herds that became infected as the result of a drought during the previous years. We had a double problem to deal with. After the war we had the drought, but to-day the disease is under better control than it has been for the last four or five years.

Mr. **Buchanan.** Do you ever look forward to when people will be sufficiently educated, and the State inspectors will be sufficiently informed to take care of the situation without this appropriation by the Federal Government?

Dr. **Mohler.** Well, Congressman, I think within five or six years this disease will be so well controlled that the Federal Government will not require much of an appropriation, except for supervisory powers, including the stockyards inspections, where we could detect the disease and inform the State authorities of the source.

Mr. **Buchanan.** It looks to me like the State authorities, being on the ground in every locality, and the people, would be better capable of keeping up and detecting this disease; and the Federal authorities would, by a campaign of education, instruct them to take an active interest in it. It seems to me the time ought to come when we could eliminate the appropriation.

Dr. **Mohler.** I believe you are right. If we have no more wars and no more droughts to set us back, this disease will be gradually but surely on the road to elimination, and in five or six years, I believe, we will be rid of scabies in this country.

Mr. **Buchanan.** We will not have any more wars.

Dr. **Mohler.** Drought handicapped us as much as the war.

Mr. **Magee.** Do the States cooperate with you?

Dr. **Mohler.** Yes, sir.

Mr. **Magee.** Do they make appropriations?

Dr. **Mohler.** Yes, sir; they make appropriations, and help out in every way. This is a very satisfactory cooperative proposition all the way through.

Mr. **Magee.** Have you that total there?

Dr. **Mohler.** $525,216.89. That includes some of the transfers. It includes the 10 per cent money that we added to this appropriation, because of the need of employing more men. Last year we were allowed to make 10 per cent allotments from other funds, so we took advantage of the 10 per cent clause and gave this appropriation money from some two or three of the other appropriations. We took a little from each.

Mr. **Magee.** Do you think you will need as much as this estimate for 1923?

Dr. **Mohler.** Yes, sir; we certainly will need it if we are going to maintain the program we started on in the last 12 months. We are holding our own, and if we are expected to hold that ground, we will need the same amount as we have for the present fiscal year.

Mr. **Anderson.** In this statement here of allotment you have a general item, about $150,000. What does that cover? This item which includes $58,000 for traveling expense?

Dr. **Mohler.** That $88,725 covers the salaries of the inspectors employed for this work.

Mr. **Anderson.** What is $44,000 in salaries for?

Dr. **Mohler.** Where is the $44,000?

Mr. **Anderson.** You do not have one of these books. I want to get the difference between the salaries under the first item.

Dr. **Mohler.** This is a different project entirely; the $88,725 item is for salaries of men engaged in the eradication of sheep scabies, and the $44,900 item is for salaries of inspectors working on cattle and horse mange in different sections of the country.

Mr. **Anderson.** Yes; I see.

Dr. **Mohler.** Most of these men are employed in the Southwest at the present time—southern Colorado, New Mexico, Arizona, Texas, and California—where the greatest number of sheep that are infected are located; while the scabies in cattle is greater in the northwestern section—in western Kansas and Nebraska, Wyoming, and South Dakota. Horse scabies is most prevalent in South Dakota and Nebraska.

Mr. **Anderson.** About $220,000 altogether is spent on scabies eradication work in sheep, horses, and cattle.

Dr. **Mohler.** Yes, sir; that is right.

Mr. **Buchanan.** What is the range of salaries for inspectors?

Dr. **Mohler.** I have got that somewhere here. The inspectors' salaries run from $3,500 down to $1,080.

Mr. **Buchanan.** Are they paid a per diem allowance for traveling expenses?

Dr. **Mohler.** No, sir; these men are all reimbursed according to the actual cost of their subsistence.

Mr. **Buchanan.** Actual cost of what?

Dr. **Mohler.** Subsistence.

Mr. **Buchanan.** Do they render an actual account of expenses?

Dr. **Mohler.** Yes, sir; but only when they are away from their official stations.

Mr. **Anderson.** You pay them the maximum per diem?

Dr. **Mohler.** We do not allow them per diem. We allow them only expenses actually incurred when away from their official stations.

Mr. **Anderson.** What would you say was the average annual salary?

Dr. **Mohler.** Between $1,900 and $2,000. We have only one man on that work at $3,500, but we have given the range from $3,500 to $1,080. The $1,080 man is on a 50–50 basis. Part of his salary is paid by the State, and the remainder is paid by the Federal Government. He is paid $2,160, of which the Government pays 50 per cent.

Mr. **Anderson.** Have you any other employees paid by the Government in that way?

Dr. **Mohler.** Yes, sir.

Mr. **Anderson.** Does that run through the whole salary list?

Dr. **Mohler.** No; not exactly. There are only seven or eight such men. We have a man in South Carolina, who gets $1,700 from the Government and $1,700 from the State of South Carolina. We have a man in Nebraska that gets $1 from the Federal Government and the rest of his salary from the State. The same way in Michigan. We have a man there that gets $10 a year. All of these men—this can be stated as a rule—when they are on this pay basis of drawing salaries from both the State and Federal Governments, are old employees, and they want to keep their status as employees of the Government. The salary is divided, sometimes 50–50, and sometimes $1 a year from the Federal Government, so they can maintain their Federal status. That is true in all these cases, and there are about eight such cases in our service.

Mr. **Anderson.** Are these inspectors trained veterinarians?

Dr. **Mohler.** They are veterinary graduates of accredited colleges.

FOR EXTENDING SUPERVISION OF INTERSTATE TRANSPORTATION OF LIVE STOCK.

Mr. **Anderson.** I wish you would tell us very briefly what is done under the interstate provision with respect to southern cattle?

Dr. **Mohler.** The supervision of the interstate transportation of live stock is maintained at all the public stock yards.

Mr. **Anderson.** That is an ante mortem inspection?

Dr. **Mohler.** That is an ante mortem inspection for contagious diseases, apart from the ante mortem meat inspection.

Mr. ANDERSON. That covers cattle not for meat or slaughter?

Dr. MOHLER. Yes, sir. It covers cattle, sheep, and swine that are brought in as feeders, stockers, or for breeding purposes, and are going out to the farms in various States. We inspect them at all the big stockyards. In the case of hogs, before they are allowed to go to the farms from such stockyards as Kansas City, Cincinnati, Omaha, etc., they must be given hog cholera double treatment in order to prevent them carrying infection from the stockyards to the farm, where the farmer takes his animals purchased at the stockyards. That is one of the most important pieces of work that the bureau is doing, to keep the feeders' dairy cattle and breeding stock from carrying diseases throughout the country to the farms where they are going.

Mr. BUCHANAN. How about the serum treatment and vaccination?

Dr. MOHLER. That works out differently in different stockyards. In certain yards the stockyards company has complete control of the serum and the men do the vaccination, but it is always done under the supervision of the bureau.

Mr. BUCHANAN. The instruction of the bureau may be all right, but I was thinking about whether or not the advice was complied with?

Dr. MOHLER. If our advice is not complied with we stop the work. We have had no trouble about their complying with our advice. They are very glad to have these certificates of health, which are sent from Kansas, Ohio, Michigan, etc., to permit those live stock to go into the State of destination. Most States have a regulation with reference to the treatment of these animals for hog cholera, and unless these hogs are treated for hog cholera, they are not permitted to come into many States. Our inspectors do not do the injecting of the serum. They do the supervision of the immunization, or in case of scabies exposure, the dipping of the cattle and sheep, and then issue the certificates, so that those live stock, sheep, cattle, or hogs may go into the States of destination, which, as a rule, demand such Federal certificates of health.

Mr. ANDERSON. You have a pretty effective check on the conditions, do you not?

Dr. MOHLER. I believe that we have an excellent system developed. The commission men are very anxious to have that hind of work go on, because it permits them freedom of sales.

PLACING EMPLOYEES ON STATUTORY ROLL.

Mr. BUCHANAN. This is a large appropriation, $534,000. Has your bureau ever considered the advisability or nonadvisability of putting these men on the statutory roll?

Dr. MOHLER. Yes, sir; Mr. Buchanan, we have given that proposition considerable thought, and the only conclusion that we can reach is that the work will be greatly handicapped in many ways if these men were put on the statutory rolls.

Mr. BUCHANAN. Of course, that is what is generally claimed. Nearly everybody, every department, would rather have a lump sum, but in view of the fact that many of the departments do not have lump-sum appropriations, there has been some criticism of the committee in bringing out a lump-sum appropriation for handling the work in the Agricultural Department. When we report out a bill and are asked what salaries these employees get, all we can say is that we do not know.

All we can say is that we are giving them a lump sum and that we have confidence in those men who administer the act, and that we do not believe that it will be abused, but that does not satisfy some of the Members of the House.

Dr. **Mohler.** Well, Mr. Buchanan, it would be the most wasteful way of handling the specially trained forces of the Agricultural Department for the reason, as I stated a few minutes ago to Mr. Magee, that this item of scabies, like many other projects, is seasonable work. If we have 180 men working on this disease from the 1st of April until the 1st of December they are busy every minute. Now, in the late fall that work starts to decrease and in the winter months there is very little of that work being done.

Under present conditions we can take those men and put them on meat inspection at the time of our peak load in meat-inspection lines. If we put these men on a statutory roll, for instance, one sheep inspector at $2,000 a year or 10 cattle inspectors at $2,500 a year, they would have to be maintained on that statutory roll of the Agricultural Department, and it would be a decided disadvantage, a loss of efficiency, and an increase in the cost of our work.

Now, our organization is flexible and we can move the men from Wyoming to Chicago or Kansas City and make a meat inspector out of a sheep inspector in 24 hours. Our force is now easily adjustable, so that we can transfer the latter at that particular time when the men in Chicago need assistance, when they are having their heavy work.

Mr. **Anderson.** When you take them off of the roll their salaries cease?

Dr. **Mohler.** Absolutely.

Mr. **Anderson.** So when they complete their work here you put them back on another roll that is carried in this appropriation?

Dr. **Mohler.** That is precisely the way we do it, and that is the reason that a statutory roll would not be satisfactory.

Mr. **Buchanan.** It all comes out of one appropriation anyhow?

Dr. **Mohler.** No, indeed, Mr. Buchanan. These appropriations are entirely different.

Mr. **Buchanan.** I meant to say that they were all Government appropriations.

Dr. **Mohler.** Oh, yes; we are all working for Uncle Sam.

Mr. **Buchanan.** That is the same reason that you emphasized that the employees do not scatter. That same reason would apply to the supervisors of interstate transportation of live stock and so on.

Dr. **Mohler.** Yes, sir; that all applies.

Mr. **Buchanan.** For the reason that you need the men for only part of their time.

Dr. **Mohler.** They are not needed so badly during certain seasons of the year as they are at others, so we change our men whenever necessary. We have been sending quite a number of field men into your country in the spring of the year, and in the fall they are sent to Oklahoma City, Houston, and Fort Worth, to the packing houses, as soon as the field work starts to decline. We keep a certain number as a skeleton organization in Texas and in the other States during the winter season, but at present the number is very much smaller than during the remainder of the working period of the year.

ERADICATION OF TICKS FROM CATTLE.

Mr. **Anderson.** Tell us something about inspection and quarantine work, the eradication of scabies in sheep and cattle, the inspection of southern cattle, and the supervision of the transportation of live stock. That is the inspection of southern cattle outside of quarantine and for the maintenance of men to clean up and complete the tick work?

Dr. **Mohler.** No, Mr. Chairman; these inspectors are located at the stockyards in order to find out whether any cattle coming from the areas under the Texas fever quarantine line are infested with ticks or not.

We have inspectors maintained at all points like East St. Louis, Kansas City, Chicago, Nashville, Fort Worth, and every stockyard where we have southern quarantine pens. Those pens are for live stock coming from southern quarantined sections where ticks may or may not be present, but they are all inspected; and when we find ticks our inspectors send telegrams to the inspector in charge of the State from which these animals originated so that the latter can start out an assistant promptly to the county whence the ticky cattle came and perform whatever investigation is necessary in order to clean up.

It is merely a system of detective work for the purpose of determining whether ticks are present or not on these cattle from the southern sections.

Mr. **Lee.** Mr. Anderson, I have just come in, and I would like to ask one question: How long will it take to eradicate the ticks in the United States?

Dr. **Mohler.** How long will it take?

Mr. **Lee.** Yes. For instance, I understand that you will get through in Georgia in 1923; is that right?

Dr. **Mohler.** Yes; that is the present plan, to eradicate the ticks from Georgia by 1923.

Mr. **Lee.** Well, couldn't you in just three or four lines in the record put in there when you will get through?

Dr. **Mohler.** Yes, sir; I could furnish you an estimate.

Mr. **Anderson.** I want to ask you about mallein and blackleg. Are you still making blackleg vaccine?

Dr. **Mohler.** Yes, sir; we are still making about 1,500,000 doses a year.

Mr. **Anderson.** Is that really being used?

Dr. **Mohler.** Yes, sir; it is being used by that relative number of ranchmen and farmers.

Mr. **Anderson.** I do not recall the facts about this proposition, but I have some sort of an impression that there is something the matter under this particular test.

Dr. **Mohler.** I remember, Mr. Chairman, that two years ago I came before the committee and requested that we either be given enough money to make an improved blackleg vaccine or else let this $5,000 appropriation for blackleg vaccine lapse entirely. I stated that there was better blackleg vaccine on the market than that which the Government was distributing free of charge.

Mr. **Anderson.** Do you regard mallein as very important?

Dr. **Mohler.** Yes, sir; I regard mallein testing as very important, since it has resulted in almost completely eliminating glanders among the horse stock of our country.

Mr. **Anderson.** How much are you spending on mallein?

Dr. **Mohler.** I should say about half of this small appropriation, about 50–50 for blackleg vaccine and mallein. We are sending a great deal of blackleg vaccine to your State, Mr. Buchanan, every year. I think Texas gets about 40 per cent of the blackleg vaccine and it is distributed mostly through the requests of Senators or Congressmen.

FOR INVESTIGATING THE DISEASES OF TUBERCULOSIS OF ANIMALS.

OPERATING EXPENSES—INDEMNITIES.

Mr. **Anderson.** All right; I think that is all on this item. The next is the item on page 26, tuberculosis, etc.

Dr. **Mohler.** Mr. Chairman, this is a very large subject. I can talk as long as you like, or I can make it as brief as possible; but the problem of the elimination of tuberculosis from among livestock is one of the biggest problems confronting the department at the present time and it is one which is getting the greatest support of the live stock interests of all the States.

At the present time we are cooperating with the entire 48 States as well as the Territories of Alaska and Hawaii.

Mr. **Anderson.** As you know, we had some gentleman before us the other day and there was some discussion as to the proposition of the distribution of this item as between administration and operating expenses and indemnity.

The bill as it is proposed carries $1,977,600, $977,600 of which is for administration and $1,000,000 for the payment of indemnities.

That seems to be somewhat out of proportion under existing circumstances.

Dr. **Mohler.** Mr. Chairman, you will recall that the policy that the department wished adopted, and the request that was made of the committee on several occasions, was not to divide this appropriation at all, but allow the general amount to be used for either operations or indemnity as the necessity of the occasion demanded, whether it be 40 per cent, or 30 per cent, but since 1919 that has not been permitted.

The orginal appropriation of 1919 was $500,000 to cover both operations and indemnity. A lump sum of $500,000 was given the Secretary of Agriculture, with the privilege of expending as much for indemnity as he saw fit, and using the balance for operating expenses. That year we expended practically $500,000. In 1920 the appropriation was increased by the act, but the wording was changed in such a way that $500,000 was given for operating expenses and $1,000,000 for indemnity.

Mr. **MaGee.** What year was that?

Dr. **Mohler**. That was 1920; and you will remember, Mr. Chairman, we asked for the general authority from the committee, when Mr. Haugen was chairman, to have that changed because $500,000 was not sufficient money for operating expenses to locate $1,000,000 worth of tuberculosis animals. The result was that we spent $534,981.89 for operating expenses, getting 10 per cent from some other funds that were not being used and we expended $900,086.66 for indemnity.

That was in 1920.

In 1921 the division between operating expenses and indemnity was considerably different and there were $800,000 provided for operating expenses and $680,440 for indemnity. Later we got $405,000 additional as an emergency fund for indemnities.

Now, out of that $800,000 for operating expenses we spent all but $39,000. We spent $761,527.68 for operating expenses. And the indemnity was practically used up.

In 1922 the program that we are following as you know provided for $978,800 for operating expenses and $1,000,000 for indemnity, with an emergency appropriation of $600,000 in addition.

Mr. **Anderson**. How much of the $978,000 operating expenses has been expended so far?

Dr. **Mohler**. We are spending about seventy to seventy-five thousand dollars a month. We are just about running on an even keel. We have divided up our expenditures so that we will not create any deficiency. In fact we never have had a deficit, as we have always stopped this work as soon as a deficit seemed apparent.

Mr. **Anderson**. But, on the same basis, $1,000,000 will not cover the payments for indemnity; will it?

Dr. **Mohler**. No; it will not. It will not be possible for us to cooperate with the States to the fullest extent under the proposed appropriation for next year, and the Secretary appreciated this when he submitted his request for $1,900,000 to the Budget Bureau, but they reduced it to $1,000,000.

Mr. **Magee**. You say that you are expending about $70,000 to $75,000 per month?

Dr. **Mohler**. Yes; between $70,000 and $75,000.

Mr. **Magee**. This will be quite a reduction, then.

Dr. **Mohler**. Yes; we will probably have an unexpended balance for operating expenses on June 30 of from $50,000 to $60,000. However, we will keep up with the work, not to the extent of the demand by the stock growers in the various States, but just as we are limited by indemnity funds. We can not decrease this work to any great extent and then expect to keep the enthusiasm going.

Mr. **Magee**. Is this appropriation expended among the States mostly?

Dr. **Mohler**. This appropriation?

Mr. **Magee**. Yes; is it expended among the States?

Dr. **Mohler**. Yes, sir; it is practically all expended among the States and extends over the 48 States.

Mr. **Magee**. For instruction?

Dr. **Mohler**. Very little for instruction, but mostly for indemnities, salaries, and traveling expenses. The proportion is shown here: In 1921 it was $508,577.94 for salaries and $5,740 for wages;

stationery and office supplies $1,868.38; traveling expenses, $182,-667.49; equipment and material $37,100.12; telephone and telegraph service, $2,019.24; miscellaneous items, $30,382.46; indemnities for animals slaughtered, $1,085,440.

Mr. **Buchanan.** While we are on that can't you give us the average salaries, the range of salaries, and about what the average is?

Dr. **Mohler.** The range in salaries for this work varies from $3,300 to $1,170.

Mr. **Buchanan.** And about what is the average?

Dr. **Mohler.** The average is about $2,000.

Mr. **Anderson.** How many of these people are employed in Washington?

Dr. **Mohler.** There are four veterinary inspectors here in Washington and there are from 232 to 250 employees throughout the United States, including the men here in Washington.

Mr. **Magee.** You could use a great deal more money than that if you had it?

Dr. **Mohler.** The demand is something that is impossible for us to meet; there has been such an enthusiasm from all sections for the work.

Mr. **Magee.** If you had a larger appropriation, would it necessarily follow that you would have to have a larger amount for administration?

Dr. **Mohler.** No, sir; the amount of money we have for administration now will cover about $2,000,000 worth of indemnity. In other words, with the same amount of money we now have for operating expenses we could find enough cattle with tuberculosis to expend $2,000,000 for indemnifying their owners.

Mr. **Magee.** According to that, would it be proper for our appropriation to be worked out about $500,000 operating expenses for each $1,000,000 indemnity?

Dr. **Mohler.** That proportion would be entirely proper in future appropriations. If you analyzed our past expenditures, they would show about 40 per cent expended for operating expenses and 60 per cent for indemnity.

Mr. **Magee.** That is the general proposition?

Dr. **Mohler.** The general proportion of previous expenditures is about two to three.

Mr. **Magee.** Do you think that we should make any appropriation that we make upon a basis of 40 per cent for operating and 60 per cent for indemnity; is that what you mean?

Dr. **Mohler.** That is about the ratio of our expenditures during the last three or four years.

Mr. **Magee.** That is what I want to get at.

Dr. **Mohler.** We have a new form of test, which was referred to Saturday as the intradermic tuberculin test, which permits finding a great many more diseased cattle as well as more healthy cattle with the same man power. In other words, one inspector can do three or four times as much work with the intradermic test as he could with the old subcutaneous test. Therefore, in the future the same amount of money for operating expenses will uncover a greater number of tuberculous cattle than has been done in the past. For this reason the ratio will, no doubt, be changed to approximately 33 and 67 per cent, respectively.

The various States have appropriated for this fiscal year over $4,000,000, and they have divided it so that about $3,000,000 can be used for indemnities and about $1,000,000 for operating expenses. The reason for that ratio is because as a rule they have a less number of inspectors than we have and are averaging a higher indemnity per animal.

Now, those gentlemen who testified here Saturday are matching us 50–50 on inspectors and are paying more liberal indemnities. They have just as many men as we have. They were telling you of the conditions as regards their respective States while I am telling you of the 48 States and trying to give you a broad national viewpoint of the situation. We have, as I said, between 232 and 250 inspectors working on tuberculosis eradication. The States have 169 inspectors, the counties have 13, the farm bureaus have 10, and the cities have 3.

In 1919, when we first started with this work, the bureau had 135 employees and the States had only 62, so you see that they are gradually catching up with us with the number of inspectors, and they will soon have as many as the Federal Government.

Mr. MAGEE. That year was the first Government appropriation?

Dr. MOHLER. That was the first Government appropriation.

APPROPRIATIONS MADE BY STATES.

Mr. ANDERSON. Have you any statement, Dr. Mohler, which shows the total amount which the States have expended for administrative expenses?

Dr. MOHLER. They have not divided their appropriations in all cases, Mr. Chairman, like we have, but I have the total of $4,000,000 appropriated by all of the States.

Mr. ANDERSON. And that is for the purpose of the payment of indemnity and inspection?

Dr. MOHLER. For the purpose of the payment of indemnity and operating expenses, and we have ascertained that 3,000,000 will be used for the purpose of indemnity. Those are round numbers I am speaking of. We have allowed $1,000,000 for indemnity, and they have allowed $3,000,000 for indemnity, so there is where the difference comes in, with $1,000,000 for Federal indemnity matching $3,000,000 for State indemnity. The only way we could approach this situation with equity for each of the States and at the same time know where we stood each month was to give the State $1 of of Federal indemnity money for each $3 of State indemnity money. And that is the way the allotment of $1,000,000 this year was made, $1 to every $3 of State money.

Mr. ANDERSON. Well, I have been wondering in my own mind as to whether the proposition that 50–50 was exactly the right basis.

Dr. MOHLER. Unfortunately, certain States have written into their law that they can not spend any money except in duplication of the allotments from the Federal Government. There are four or five States that have done this. They are unable to expend any indemnity money except for the purpose of matching the Federal allotment. That is the reason why, Mr. Buchanan, that some of the Members here from Texas have recently become so interested in getting a larger Federal allotment, because of the fact that your sanitary board got money from the State legislature to be used only in matching the allotment by the Federal Government, and there were several other States that did the same thing.

Mr. **Buchanan**. Do you mean that Texas has written into the law a proviso whereby she must get dollar for dollar from the United States Government?

Dr. **Mohler**. I do not know whether it is in the law, but the result is that they can not pay any indemnity money unless it is matched by the Federal Government.

Mr. **Buchanan**. On this tuberculosis?

Dr. **Mohler**. On tuberculosis; yes, sir.

Mr. **Anderson**. You follow the same policy from this end?

Dr. **Mohler**. We can not by law exceed the amount of indemnity money paid by the States. We do not even match them in many States. We never exceed their appropriation, but we very frequently pay less.

Mr. **Buchanan**. Well, Doctor, as a matter of fact, the more that is paid by the State in giving instruction to cattlemen—the more expended by the States—the better it is?

Dr. **Mohler**. Surely.

Mr. **Buchanan**. And if they can get one-third—the States pay two-thirds and the Federal Government one-third—it is better than 50-50?

Dr. **Mohler**. Yes, sir. The way this indemnity was originally planned was for the State to pay one-third, the Government to pay one-third, and the owner to lose one-third of the difference between the appraisal and the salvage, not to exceed $25 for grades and $50 for pure breds as our share. This, it was thought, would create an interest on the part of the farmer himself in keeping his herd clean.

Mr. **Buchanan**. I have my doubts as to whether the Federal Government ought to go further than one-third at all.

Dr. **Mohler**. Should not go further than one-third?

Mr. **Buchanan**. Yes. We do that with all of these things on all of these appropriations, and if we continue to do that with all of them we will not be able to find subjects for taxation to pay the expenses of the Federal Government. This is not the only place where it is so.

Dr. **Mohler**. In that connection, I hope that we will reach a point where the Government will not have to pay more than one-fourth. That is what we hope to come to within a few more years, but we are not ready for it yet.

PERCENTAGE OF CATTLE AFFECTED WITH TUBERCULOSIS.

Mr. **Buchanan**. What is your estimate as to the number of cattle in the country that have tuberculosis?

Dr. **Mohler**. Well, that varies considerable. We have tested during the last six months over 1,000,000 head of cattle, and we found 3.6 per cent infected. Now, I think that is entirely too high an average for the country if you include the beef cattle. It is not too high if you include only the dairy cattle.

Mr. **Buchanan**. I understand that with the dairy cattle it is about 10 per cent.

Dr. **Mohler**. That was the figure 12 years ago; but we have greatly lowered that figure, Mr. Buchanan, with the dairy cattle since that time.

Mr. **Buchanan**. Well, at any rate, there is an immense amount of infection in the United States.

Dr. **Mohler**. That is true; yes, sir.

Mr. **Lee**. You think about 3 per cent would be about it?

Dr. **Mohler**. Well, if you include all classes of cattle it would be less than 3 per cent. With dairy cattle the percentage would range higher.

I have a little statement here that would be of interest to you with regard to tuberculosis in a great many States. I figured it out some time ago that in 16 States the amount of tuberculosis is under 2 per cent; in 19 States the percentage ranges between 2 and 5 per cent, or a total of 35 States with less than 5 per cent; in 10 States the average is between 5 and 10 per cent; and in 2 States the average is over 10 per cent.

Mr. **Magee**. What are those two States?

Dr. **Mohler**. Your State, and Connecticut. Connecticut has 26 per cent, from her last figures.

Mr. **Magee**. And what does New York have?

Dr. **Mohler**. About 11 per cent.

Mr. **Buchanan**. Do you know the total number of cattle in the United States?

Dr. **Mohler**. Yes; there are about 23,000,000 dairy cattle and about 44,000,000 beef cattle.

Mr. **Buchanan**. Do you know the total number of cattle in the United States?

Dr. **Mohler**. Yes.

Mr. **Buchanan**. Well, with even 3 per cent of these cattle infected, or 2 per cent, there would be an enormous expenditure, or enormous expenses would be imposed upon the Federal Government if they pay half of the expenses.

Mr. **Anderson**. What is the average indemnity this year, so far?

Dr. **Mohler**. $25.25 is the average Federal share and $39.08 is the average State share for cattle already condemned and paid for.

Mr. **Lee**. That means that with breeding or high-grade cattle that you pay more than you do for ordinary beef cattle?

Dr. **Mohler**. Yes; we pay not to exceed $50 for pure-bred cattle and not to exceed $25 for grades.

Mr. **Lee**. That is, the Government?

Dr. **Mohler**. The Government; but, of course, the States vary extensively. There are only about 10 or 11 States, if that many, that pay the same as we do. These States make it 50–50. All of the other States go beyond our indemnity.

Mr. **Lee**. Mr. Anderson, the statement which Dr. Mohler has is not very long, and I suggest that he put it in.

(The statement follows:)

Status of cooperative tuberculosis eradication work and indemnity averages, Jan. 1, 1922.

State.	Total accredited.		Number under test not accredited.		Number on waiting list to be tested.		Average Federal indemnity, July to December, 1921.	Average State indemnity, July to December, 1921.
	Herds.	Cattle.	Herds.	Cattle.	Herds.	Cattle.		
Alabama	57	3,215	710	24,064	....	....	....	....
Arkansas	29	830	71	1,100	8	300	....	....
Colorado	1	37	14	614	30	2,025	$50.00	$50.00
Connecticut	50	1,146	523	13,212	236	4,547	16.07	30.53
Delaware	74	1,353	1,676	9,010	20	300	22.72	35.56
District of Columbia	194	815	340	1,373	....	....	....	....
Florida	74	2,615	3,301	37,083	50	1,200	5.11	10.24
Georgia	9	625	1,469	22,870	....	....	....	....
Idaho	105	3,712	3,617	32,926	125	2,000	23.42	23.42
Illinois	304	7,729	1,736	30,382	460	10,008	31.66	31.66
Indiana	568	12,974	7,923	76,248	2,000	18,000	26.86	37.19
Iowa	377	9,839	3,749	80,466	3,427	71,147	25.94	29.31
Kansas	285	8,776	782	24,560	56	1,815	35.13	69.42
Kentucky	151	4,511	3,311	35,645	700	7,000	22.81	60.55
Louisiana	48	2,039	379	11,697	....	....	....	....
Maine	604	6,999	5,418	46,270	732	3,132	21.99	65.61
Maryland	299	5,896	1,832	27,083	500	5,000	23.47	23.47
Massachusetts	42	1,438	183	6,399	1	17	24.71	60.00
Michigan	264	5,669	10,203	102,005	460	9,888	24.22	49.22
Minnesota	1,268	30,268	4,307	94,438	1,392	27,840	11.86	23.76
Mississippi	114	2,556	594	13,632	85	1,200	21.67	36.25
Missouri	338	9,772	10,201	117,064	8,000	70,000	25.82	25.82
Montana	113	6,091	12,239	173,615	....	....	19.17	43.13
Nebraska	152	4,017	4,049	58,720	290	4,784	20.91	20.91
Nevada	5	782	1,774	17,376	....	....	21.77	40.07
New Hampshire	29	792	270	5,816	95	1,815	26.08	48.53
New Jersey	59	1,749	283	8,168	40	989	36.03	67.85
New Mexico	....	....	158	1,539	25	300	....	....
New York	253	5,915	4,617	131,452	1,300	35,000	33.16	73.62
North Carolina	261	5,168	6,337	41,095	118	496	23.80	23.80
North Dakota	340	8,219	4,158	82,053	200	2,000	13.63	13.63
Ohio	512	9,815	2,540	43,784	500	10,000	30.50	30.50
Oklahoma	89	3,160	1,110	21,836	48	2,270	27.41	50.65
Oregon	110	2,970	6,226	82,594	1,200	10,000	30.39	30.39
Pennsylvania	844	13,922	2,586	42,905	1,001	10,000	34.33	52.01
Rhode Island	9	238	33	862	1	11	26.57	46.79
South Carolina	65	2,347	623	11,963	20	525	14.03	14.03
South Dakota	128	2,969	563	14,356	379	9,478	26.01	44.71
Tennessee	180	6,309	797	20,261	4	88	44.64	93.94
Texas	20	738	202	12,999	36	2,420	35.46	35.91
Utah	60	2,068	5,905	39,136	....	....	27.26	27.26
Vermont	846	15,470	3,888	61,661	1,113	15,744	20.06	20.06
Virginia	601	14,456	2,269	39,208	....	....	29.03	39.26
Washington	79	2,177	3,798	28,849	1,750	5,500	25.85	25.84
West Virginia	142	2,848	1,485	15,875	175	1,500	22.25	42.95
Wisconsin	1,435	33,377	3,684	91,493	600	13,800	24.07	24.07
Wyoming	....	....	1,548	15,907	....	....	18.06	18.33
Total	11,587	268,411	138,481	1,871,664	27,180	362,139	25.25	39.08

Mr. Anderson. I would also suggest that you put in some of those statements, including the one I asked you for the other day, if you have it.

Mr. Lee. Showing the percentage of States. What are your percentages as to Georgia?

Dr. Mohler. The percentage of diseased cattle in Georgia?

Mr. Lee. Yes.

Dr. **Mohler**. Two and seven-tenths per cent. The statement is as follows:

Tuberculosis-eradication work from July to December, 1921, inclusive.

	Herds tested.	Cattle tested.	Reactors found.	Per cent reactors.
Alabama	435	12,251	92	0.8
Arkansas	25	960	19	2
California	....	....	....	....
Colorado	13	713	33	4.6
Connecticut	395	8,758	2,333	26.6
Delaware	782	5,590	419	7.5
District of Columbia	55	143	5	3.5
Florida	734	10,338	181	1.8
Georgia	201	5,578	151	2.7
Idaho	1,079	15,255	144	.9
Illinois	1,417	18,880	1,107	5.9
Indiana	4,199	43,219	1,080	2.5
Iowa	2,234	48,154	2,758	5.7
Kansas	523	13,993	288	2.1
Kentucky	1,912	19,179	396	2.1
Louisisana	234	6,826	162	2.4
Maine	2,631	18,291	438	2.4
Maryland	1,106	13,993	1,327	9.5
Massachusetts	162	4,627	297	6.4
Michigan	7,453	68,008	2,047	3
Minnesota	2,310	47,778	1,444	3
Mississippi	1,161	9,882	70	.7
Missouri	8,609	91,847	922	1
Montana	3,427	45,836	469	1.02
Nebraska	3,603	51,652	1,127	2.2
Nevada	558	4,020	60	1.5
New Hampshire	194	3,683	325	8.8
New Jersey	295	8,256	715	8.7
New Mexico	158	1,539	13	.8
New York	1,924	41,767	4,706	11.3
North Carolina	4,773	21,669	295	1.4
North Dakota	1,496	27,864	854	3.1
Ohio	1,362	20,839	950	4.6
Oklahoma	678	17,320	531	3.1
Oregon	3,741	30,961	481	1.6
Pennsylvania	1,792	27,929	1,655	5.9
Rhode Island	25	633	45	7.1
South Carolina	497	10,956	139	1.3
South Dakota	391	10,322	271	2.6
Tennessee	507	11,900	176	1.5
Texas	117	10,597	379	3.6
Utah	3,283	16,797	127	.8
Vermont	2,091	36,739	3,256	8.9
Virginia	1,550	22,269	856	3.8
Washington	4,497	39,117	749	1.9
West Virginia	928	10,070	219	2.2
Wisconsin	3,013	71,958	2,211	3.1
Wyoming	994	7,594	93	1.2
Total	79,564	1,016,550	36,415	3.6

Mr. **Magee**. Do you know whether or not when Congress began appropriating for this in 1919 the percentage has materially decreased, the average percentage?

Dr. **Mohler**. Of our reactors since 1919?

Mr. **Magee**. The percentage infected.

Dr. **Mohler**. Yes; it has decreased.

Mr. **Magee**. Now, are you able to give us some idea as to what extent?

Dr. **Mohler**. In 1919, as I recall the figures, we had about 5.2 per cent reactors, and the next year slightly lower, while during the last two years it has not been, I think, above 3.9 per cent for 1921, and for the six months of this fiscal year, 3.6 per cent. There has been almost a 2 per cent decrease in the figures that we have by years. We have done all this work in cooperation with the States and with the voluntary assistance of the farmers themselves.

Mr. **Anderson.** Well, is this reduction greater in the States, as a rule, in the sections where tuberculosis was prevalent or in the sections where it was less prevalent?

Dr. **Mohler.** At the beginning the greatest reductions, of course, were made where the disease was less prevalent, but in the last 15 or 18 months a very material change has been noted even in sections where the disease has been quite prevalent.

On December 5, 1921, the bureau requested the inspectors in charge of tuberculosis eradication work to furnish certain information relative to the practical results obtained in freeing badly infected herds from tuberculosis. All herds which had received original and at least two retests, and which contained not less than 10 per cent of reactors on original test, were to be included in the report. The following table gives the results of the compilation of 1,882 herds:

	Number of herds.	Number of cattle.	Number of reactors.	Per cent reactors.
Original test	1,882	58,102	15,014	26.0
Second test	1,882	52,650	3,662	6.9
Third test	1,882	56,457	1,583	2.8
Fourth test	918	25,852	480	1.8

This report is extremely interesting as it shows that under normal conditions herds very badly diseased may be established as relatively free in a short period of time. Another point worthy of attention is that on the third test the total number of cattle contained in these herds was approximately the same as on the original test. This disposes of the theory of some individuals that tuberculosis-eradication work conducted on an intensive scale will destroy the cattle industry in America.

In addition to this information a special report was requested on those herds which had shown erratic results on successive tests. Despite the fact that this information was requested from all inspectors in charge and that all submitted their reports, a surprisingly small list of such herds was submitted, the number being less than 100. When it is remembered that on December 1, 1921, there were under supervision 126,668 herds of cattle, it will readily be seen that only occasional herds are encountered which do not show sufficiently satisfactory progress in eradicating the disease.

Mr. Chairman, for the information of the committee, I would like to say that the number of cattle totally accredited up to the 1st of January, 1922, was 268,411 in 11,587 herds; that the number of animals found free after one test was 1,051,278 in 96,644 herds; that the number of other animals under test, but not accredited nor found free on one test as yet was 1,871,644 in 133,481 herds; and the number of cattle on the waiting list to be tested was 362,000 in 27,180 herds.

STATUS OF TUBERCULOSIS WORK.

Mr. **Anderson.** How many were tested last year?

Dr. **Mohler.** In the last six months there were over 1,000,000 head tested.

Mr. **Anderson.** Then we have not such a large number remaining?

Dr. **Mohler.** We have 362,000 individual animals. We tested last year over 2,000,000, and we are going to test more than that number this year.

Mr. **Anderson.** According to these figures it would seem as though you had kept pretty well up with the applications.

Dr. **Mohler.** The figures show we are 27,000 herds behind.

Mr. **Anderson.** You have always some applications?

Dr. **Mohler.** Yes; and without putting forth any efforts in that direction.

Mr. **Lee.** Was that last year or this year you tested?

Dr. **Mohler.** In the past six months we have tested a million head, and there are 362,000 on the waiting list, the owners of which are asking us to test the animals. Those are the animals we have not gotten to as yet. As a matter of fact, what we are doing is attempting to hold down the enthusiasm of these men. We can not take care of the requests that are now coming in. We are trying to keep our hands on the wheel, so to speak, and are guiding the work as well as we can, to avoid getting swamped with applications.

Mr. **Lee.** Do you think it is possible to stamp out tuberculosis entirely?

Dr. **Mohler.** We are not going to be able to stamp out tuberculosis entirely in my time or your time, but we are going to be able to eradicate tuberculosis in 10 years in more than half of the States. It depends, of course, entirely on what States you are speaking of as to whether we can get through in 10 years or 50 years.

Mr. **Anderson.** Do you mean in the States where they have the most of it or the least?

Dr. **Mohler.** In the States where they have the least. In the old dairy centers we will have the most trouble.

Dr. **Ball.** Even in those States it will be gradually cleaned up.

Dr. **Mohler.** Yes. In Wisconsin we will have less trouble in the northern part of the State. In the lower tier of counties we will have more trouble, because the percentage of disease is greater.

Mr. **Anderson.** There is one little change in the language here which I think was suggested last year, but for some reason or other we did not make it.

Dr. **Mohler.** You mean "when" for "where"?

Mr. **Anderson.** "Where" for "when."

Dr. **Mohler.** Yes.

Mr. **Anderson.** Give us the reason for making that change, on page 27.

Dr. **Mohler.** Mr. Chairman, the solicitor of the department is of the opinion that the word "where" should be inserted in preference to "when," in order to carry out the idea of the entire law. It is his view that "where condemned" is preferable to the term "when condemned." "When" indicates time; "where" indicates place. It is not significant as to time, but it is very significant as to place.

FOR THE ERADICATION OF SOUTHERN CATTLE TICKS.

Mr. **Anderson.** Let us take up page 29: "For all necessary expenses for the eradication of southern cattle ticks." The amount is $660,000. Tell us how far you have gotten along with it.

Dr. **Mohler.** If you will let me have that map, I can indicate it.

The department is asking for precisely the same amount for the eradication of southern cattle ticks for next year as it has for the present year. The work that has been accomplished during this last fiscal year has resulted in a total release of 32,171 square miles of previously infested territory. That was for the fiscal year 1921. In the first six months of the present fiscal year 1922, we have been able to release 16 counties in Georgia, 4 parishes in Louisiana, 2 counties in North Carolina, and 27 in Texas, making a total of 29,563 square miles released on the 1st of December, 1921. This means a release of approximately 72 per cent of all previously infested territory since the work began in 1906.

What we are trying to do is to make our plans so that for the fiscal year 1923 we will continue the same identical line of work that we have been doing for the last 10 or 12 years. This map [indicating] will show how much of the infested territory remains. We have cleaned up in California, as well as in Mississippi, South Carolina, and many portions of other States. We are working in these States where the territory is marked in red, with the exception of Florida. We have not been able to continue our operations in Florida on account of local conditions, but owing to the fact that a new governor has been elected and to the action he has taken in the matter, they are outlining now a plan for renewing operations.

Mr. ANDERSON. I remember that last year there was a great deal of talk, if not complaint, and the claim was made that the department had required the shipment of cattle long distances and that that made trouble in handling these wild cattle in the larger centers, such as Jacksonville, and that it made the work difficult and expensive.

Dr. MOHLER. I do not know, Mr. Chairman, what reports you have, but, as a matter of fact, while we were working in Florida the counties where we were working had a central point, a shipping station to which they could ship or from which they could ship without difficulty, as we had inspectors there to make the necessary inspections. If the county was not working with us, we had no men there to make these inspections, and then the only way they could get inspection was to ship into Jacksonville. It would, under those circumstances, cost approximately three times as much to send our inspectors to the individual farms to make inspections in noncooperating counties. Instead of sending a man to an individual farm, we of necessity must ask the shipper to bring the cattle to the points where our inspectors are located. That, however, applies only in places where they are not cooperating in dipping work. Jacksonville was the center for that part of Florida. It was the place where they had dipping vats. When the State of Florida refused to appropriate funds for tick eradication last year we withdrew our men from Jacksonville.

Mr. ANDERSON. When do you expect to finish this cattle-tick work? How long will it take, at the present rate?

Dr. MOHLER. We have 28 per cent of infested territory still remaining. It is going to take a considerable time to clean up States like Texas, for instance. The nearer you get to the Rio Grande the harder the task will be.

I may state that the Legislature of Texas has divided that State, as you will remember from previous testimony, into three zones,

zones 1, 2, and 3. They have practically cleaned up zone No. 1, have about half cleaned up zone No. 2, and zone No. 3 is to start work in 1922. Just about half the counties that were in zone No. 2 have been worked. We are not going to be able to clean up the southern portion of Texas for four or five years, probably, as some of the largest and wealthiest cattlemen in that zone are opposing the work.

In Georgia we expect to have the ticks eradicated by 1923. The same is true of Oklahoma. In Arkansas and Louisiana there has been a backward step in the last 18 months, especially since the war. Some of those fellows have not been willing to comply with the regulations. They have allowed ticky cattle to come in and there has been some reinfection in several of the parishes of Louisiana and in Arkansas. At the present time we feel that this lethargy is being overcome by our educational campaign, recently established. We are using the moving pictures down there and are telling these people, by moving pictures, about the benefits of tick eradication. So it is impossible to say just when the whole infected territory will be released.

Mr. ANDERSON. Has this period of industrial depression had any effect upon any of your work?

Dr. MOHLER. Yes; markedly, along certain lines. It has had more effect on tick eradication than on the tuberculosis work, because in tick eradication the cattle owner is called upon to put in the vat, and in many cases he is also called upon to purchase, the arsenical solution for the dip. It costs money to get the things that he needs for dipping his cattle. You see, we are not allowed by law to furnish money for dipping vats or for the arsenical solution in which the animals are dipped. That is paid for either by the county, through assessments of owners in the country, or sometimes by the cattle raisers themselves. That, in itself, has been an obstacle in tick and scabies eradication, but not in tuberculosis.

Mr. ANDERSON. Do the cattle in these areas show any marked improvement in condition?

Dr. MOHLER. Yes; they show not only that improvement has come about so far as meat is concerned, but they give more milk and bring higher prices on the market. These cattle, after they have been freed from ticks, are not sold at the big markets like East St. Louis and Kansas city, in quarantine pens like their ticky neighbors. They have access to the same pens as the other cattle from healthy districts, and the result is that there is better competition in bidding.

Mr. ANDERSON. These ticky cattle, when they go to market, are, as I understand it, separated from those free from ticks?

Dr. MOHLER. Yes, sir; the ticky cattle are placed in quarantine, and in the southern cattle pens the competition is less and the prices range from 35 to 50 cents a hundred less than for similar cattle in clean pens. After the animals are cleaned of ticks and get into clean territory, the owners appreciate it very much. While they are going through that stage, however, some owners can not see the benefit, but when the cattle are once released from quarantine they realize and appreciate it. Then they find that these beneficial effects we have talked about are true and not imaginative. You can not then get them to put ticks on their cattle again, after they have once been released from quarantine. However, some of the owners of ticky cattle think that this dipping is foolish business. Their grandfathers' and their father's cattle had ticks on them, and so they come to believe that ticks are not objectionable after all.

Mr. **Lee.** To what extent have the cattle been affected by these ticks, as to the blood?

Dr. **Mohler.** That depends on how heavily infested the cattle are. The ticks not only suck blood from the cattle, but some blood oozes from the punctured skin, when the ticks change their positions on the animal. When a cow is fairly well infested with ticks she will lose six pounds of blood per month. This has been worked out on a scientific basis.

FOR INVESTIGATION AND EXPERIMENTS IN DAIRY INDUSTRY.

Mr. **Anderson.** Let us take the item on page 30—"necessary expenses for investigations and experiments in the dairy industry."

Dr. **Mohler.** If you will pass that for a moment, Dr. Larson will take care of it. We will come back to that, with your permisison.

Mr. **Lee.** The record will show that.

FOR SCIENTIFIC INVESTIGATION OF DISEASES OF ANIMALS, INCLUDING MAINTENANCE, ETC., OF EXPERIMENTAL STATION AT BETHESDA, MD.

Mr. **Anderson.** The next item is on page 33, necessary expenses for scientific investigation in diseases of animals.

INVESTIGATION OF INTERNAL PARASITES OF HOGS.

Dr. **Mohler.** We have requested for this general item an increase of $12,500 for the investigation of parasites of hogs. This is the item, you will recall, Mr. Chairman, that we asked for last year, but on account of reasons for economy we did not receive it. This is to introduce the hog parasite work that has been so successfully carried on in McLean County, Ill., into other sections of the country. It has cost about $8,000 or $10,000 a year, and we would like to double the amount of work we have been doing on hog parasites. We want to go into Colorado, for instance, to see what variations we have to follow to get the same results as we have gotten in Illinois.

Mr. **Anderson.** Has the method of doing this work been worked out in McLean County, Ill.?

Dr. **Mohler.** Yes; it is now called the McLean County system. Last month at the International Live Stock Show in Chicago we featured this work on parasites, and the farmers and hog raisers showed a deep and commendable interest in it. I may say that the agricultural papers pictured it as one of the biggest and most instructive sanitary exhibits that has ever been shown. It was worked out on a practical basis. Pigs infested with worms were shown in their usual environment. Pigs without worms were also shown in sanitary quarters, and the different methods of sanitary feeding and watering were reproduced. There was always a big crowd of farmers around, and they not only looked on curiously but asked a great many questions.

At this meeting we had two men attending who explained the various steps required to keep young pigs from becoming parasitized. There are at the present time about 12 States holding meetings through the Missouri Valley. They have written in and asked for speakers to come and tell them about this McLean system, but we have not sufficient funds to comply with all these requests.

It is purely a question of knowing the life cycle of the long round worm, the ascarid, that you find so commonly in the intestines of the hog in the slaughterhouse. You then attack the vulnerable stages of the parasite by adopting sanitary measures. I explained this rather fully at the hearing of last year.

Our investigations in the bureau have shown that the intestines of hogs do not become directly infested with this intestinal parasite by drinking contaminated water or eating contaminated food, with the subsequent growth and development of the eggs solely in the intestine as was formerly believed. Instead the eggs are swallowed and hatch out as larvæ in the intestines. Then the larvæ are absorbed from the intestines by the blood stream and are carried to the liver and then into the lung, where they develop more or less irritation. They may cause thumps or pneumonia and frequently stunt the growth of the pig. After the worm gets to that stage of development it crawls up the windpipe to the throat and is swallowed, going into the stomach, and then the intestines, where it develops into a worm 12 or 15 inches long, and that worm, with its numerous relatives, takes a great deal of nourishment from the hog.

The McLean system plans to take care of the sow before she has a litter of pigs. The first step is to wash her belly thoroughly and then put her in a clean, sanitary pen with plenty of straw to prevent her from wallowing in the mud and thus contaminating her nipples. When her litter of pigs are born they will not be suckling at breasts with a lot of mud contaminated with worm eggs on them, but will suckle the clean breasts of the sow. When the pigs are about 2 weeks old they are moved out into a clean pasture where no hogs have been kept, and are held here until they are 4 months old. In this way the young pig is prevented from picking up the eggs of this round worm until he weighs about 100 pounds, after which time he is quite resistant to this parasite. By this simple method of prophylaxis and prevention these young pigs are prevented from becoming contaminated with the eggs of the round worm at the time when they are especially susceptible.

Mr. ANDERSON. Is the diagnosis of this disease difficult?

Dr. MOHLER. Yes, sir. It has been confused up to the present time with every other disease that I know of. It is confused with hog cholera, with swine plague, with mixed infection, with enteritis, and various other diseases. That is one of the reasons why our men are being asked to these different meetings to explain the differences between the symptoms and treatment of this disease and these other troubles. The results of these investigations have been eagerly received by the swine raisers of the Middle West, who appreciate in them the solution of many of their troubles in the raising of hogs.

Mr. ANDERSON. It is not only a question of curing one herd, but it is a matter of preventing the recurrence of this disease?

Dr. **Mohler.** Yes, sir; it is like any other chain of prophylactic procedure in that if you forget one of the links you can get into serious trouble.

Mr. **Buchanan.** It is a matter of sanitation, is it not?

Dr. **Mohler.** Yes; but the method of sanitation is dependent upon our recently discovered history of the life cycle of this worm.

FOR IMPROVEMENT, REPAIRS, ETC., OF QUARANTINE STATIONS.

Mr. **Anderson.** There is one thing that I forgot to ask you about. On page 25 there is an item dealing with inspection and quarantine work. There is a proviso that not to exceed $15,000 shall be used for improvement and repairs to quarantine stations. My recollection is that was new last year.

Dr. **Mohler.** That was new last year. We asked for $30,000 and we obtained $15,000 to repair buildings at Boston, Athenia, and Baltimore.

Mr. **Anderson.** Will this complete that work?

Dr. **Mohler.** Yes; this item will complete that work. We did not do anything at the New York station. We spent this year's $15,000 at Baltimore and Boston. There are 14 buildings badly in need of paint and repairs at Athenia, and we need this amount in order to finish the work at the New York station. We got only $15,000 of the $30,000 requested last year.

Mr. **Anderson.** I do not remember what the amount was. I knew that we had it last year.

Dr. **Mohler.** We finished up two stations, but the New York station is to be completed in case we get this amount.

In connection with this item on roundworms, last year we sent a man to the San Luis Valley in Colorado to apply the McLean system. He found that it would be necessary to reverse the method on account of the high altitude and the dryness of the climate. They had to work on a different basis entirely from that in Illinois, showing that the biology of a plant or parasite is not always the same in all places. The change in methods was largely due to the altitude and the climatic conditions in the San Luis Valley.

Mr. **Anderson.** Under this item for $31,240 for investigation purposes are you making progress?

Dr. **Mohler.** We are, Mr. Chairman. Last December at the United States live stock sanitary meeting we had one of our scientists present the bureau's investigations of abortion as the result of expenditures from this fund. That was done at the request of Mr. Glover, editor of Hoard's Dairyman, who was largely responsible for obtaining this special appropriation. Mr. Glover published that article in Hoard's Dairyman and then wrote an editorial commending the work done with this fund. The principal results that have recently been obtained are the benefits derived from what we call the "live culture" vaccine. We have innoculated a large number—probably several thousand—animals, and the result has been that about 90 per cent of the animals innoculated have given birth to normal, healthy calves in herds some of which had not had a normal calf crop for several years and some of which had only from 25 to 76 per cent of calves. The result has been that in some herds we now have 90 per cent of normal living calves.

Mr. **Anderson.** I know that a great many dairymen feel that this is about as important as the eradication of tuberculosis, so far as calves are concerned.

Dr. **Mohler.** It is. It is a very serious proposition, but we feel that we are on the right track. We have done some excellent work in the last year. It takes a long time, of course. You get but one calf a year. It is not like working with wheat or corn. You have to work with one animal for an entire year to tell whether you are making any headway or not. The fine thing about our abortion investigation is that Hoard's Dairyman took this scientific paper and, noting many practical and helpful suggestions for the farmer, published it and made favorable comments upon it, stating that they were pleased and interested in the fact that we had obtained such valuable information on the cause, modes of dissemination, channels of infection, treatment, and prevention of this serious menace to the live-stock industry.

Mr. **Anderson.** There is an item here for the maintenance of the bureau experiment station at Bethesda, Md.

Dr. **Mohler.** Yes; that is on page 38.

Mr. **Anderson.** I suppose we can pass that.

FOR INVESTIGATION OF HOG CHOLERA.

The next item is, on page 35, for investigating the disease of hog cholera, and for control or eradication, $510,000.

I think you had better tell us something about hog cholera and how this is progressing.

Dr. **Mohler.** This item on page 35, you will recall, is divided into three projects: The first is the eradication of hog cholera, the second is supervision and regulation of the preparation of hog-cholera serum and other biological products, and the third is to cover researches concerning how cholera and related diseases.

During the last year we have taken into account mortality from hog cholera, and the figures show that the disease was kept down to 39.3 hogs per 1,000. This is a slight decrease from the previous year, and is extremely low when compared with the previous record of 144 cholera hogs per 1,000.

The hog-cholera eradication force is rather small compared with what we had during the war period. We now have 84 men working in 31 States. They are in the principal hog-producing States in the Union. They have been holding meetings and demonstrating the use of hog-cholera serum to gatherings of farmers and county agents in States where the county agents are expected to do the work. They have had demonstrations before farmers who have been brought in from the different communities, not only to look at the post mortems on head hogs but also to take note of the methods in use in respect to cleaning and disinfecting the premises after the disease has been found and eradicated. There were a number of thousands of farms that were quarantined, not as the result of our law but in cooperation with the State authorities. The States do the actual quarantining.

In the last three months, starting with the 1st of October, there was a considerable outbreak of cholera in the hog-producing States. It started almost overnight. In fact, one of the men in Ohio told me he woke up in the morning and found letters and telegrams from all over the State to the effect that many outbreaks of cholera were appearing. We put most of our available men in four or five of these Central Western States. They gave instructions, demonstrations, and lectures. They helped to get serum to these farmers and to do the vaccinating and everything that was possible to check the disease. The idea was to stamp out the primary center and keep it from spreading to neighboring farms. In about six or seven weeks it disappeared, as this same fellow said, overnight. He woke up six weeks later and there were no more reports of hog cholera. The remarkable thing about the whole incident is that instead of spreading from farm to farm like it used to do, there were only a few farms where it spread from the original center. When our inspectors got to the infected farms and sent notices to all the neighbors and told them what to do to prevent the disease from getting on their farms, it had a very beneficial effect. The result was that very few secondary centers developed.

Mr. ANDERSON. Are you doing intensive work along this line and under this item now?

Dr. MOHLER. No, sir. We have only 84 men working in 31 States. The greatest number we have in any one State is three, and in many States there is only one inspector. We are merely keeping our thumb on the situation, so to speak, in cooperation with the State officials. In cases like this recent outbreak we assist the sanitary officials in the States.

Mr. ANDERSON. I suppose the idea is to maintain a skeleton organization?

Dr. MOHLER. Yes. Where there is an unusual amount of infection we increase the number of inspectors by transfer.

Mr. ANDERSON. Where there is infection you augment that skeleton organization, I suppose?

Dr. MOHLER. Yes. We do not do intensive work at all. We can not do that with $285,000. We do just what you say—maintain a skeleton organization and augment it when it is absolutely necessary.

Mr. ANDERSON. I have been wondering about these epidemics, which seem to be more or less cyclical. I have been wondering when we would get anywhere on the basis of area work.

Dr. MOHLER. I do not think we will get anywhere by that method. The thing to do is to keep the outbreak from spreading to the adjacent farms so far as possible.

Mr. BUCHANAN. Is there not always some hog cholera in the United States?

Dr. MOHLER. Yes, sir.

Mr. BUCHANAN. Is there not always some hog cholera in every State?

Dr. MOHLER. No, sir.

Mr. BUCHANAN. Then these agents may be in different States where there is no hog cholera?

Dr. MOHLER. Not in those States we are working in. These 31 States in which they are working are the big hog-raising States.

Of course, I realize that in States like Maine, Rhode Island, and perhaps Minnesota there are long periods when there is no hog cholera at all. I do not know, however, of any time when there has been no hog cholera in Indiana, Iowa, Illinois, and other corn-belt States. There is generally an outbreak of this disease somewhere in those States.

Mr. Buchanan. Do your agents stay there for the purpose of combating this disease?

Dr. Mohler. We have only one to three hog-cholera men in each of those States. The point is that we have a very flexible force. When we have a serious outbreak of cholera at a certain point we take available men from any other activity into the field to study and handle it, just as they handled the disaster at the Knickerbocker Theater Saturday by drawing upon the Army. We do not keep these men on hog cholera when the outbreak subsides. As I have stated, one or two of these men are on hog cholera in 31 States and make up a skeleton organization. We often turn loose the tuberculosis men in these States. When the hog-cholera man has no hog cholera to contend with, we tell him to perform tuberculosis work, and then he is paid out of the tuberculosis fund. If, for instance, he spends three days on tuberculosis, that appropriation pays for it. When there are no cattle to be tested for tuberculosis in Texas, or no work for a hog-cholera man to do, we send him out to dip cattle for ticks, and then we charge his time against the tick-eradication appropriation.

Mr. Anderson. In other words, if he is not working on hog cholera he is working on something else?

Dr. Mohler. Yes, sir.

Mr. Lee. In some of these counties they are not permitted to inoculate, I believe?

Dr. Mohler. In many States they are not. In other States they have not enough men to do the work, and they are then allowed to train men to do the inoculations.

Mr. Lee. The demonstrating agents in the counties are not permitted to do it, are they?

Dr. Mohler. Only for demonstration purposes.

Mr. Anderson. Is this inoculation pretty prevalent?

Dr. Mohler. In certain sections they do more than in others. In Illinois, Indiana, and some of those States they do not do much of it. In Nebraska the State law permits the farmer to treat his own hogs and those of his neighbors. In Oklahoma and in the South, where there are not many practitioners, some farmers do it for themselves. In Ohio, Pennsylvania, and some other States they are not allowed to do it. There the veterinarians are the only ones permitted to use this simultaneous treatment.

Mr. Lee. If the county agent were permitted to do it, he would be more valuable.

Dr. Mohler. In certain States they do it. I know in one county, the county agent made $7,000 in one year treating hogs for cholera.

FOR ENFORCEMENT OF THE VIRUS-SERUM-TOXIN ACT.

Mr. Anderson. I would like to know something about the other part of this appropriation for carrying out the act of March 4, 1913, regulating the preparation, sale, barter, exchange, or shipment of any virus, serum, and so on. That is an old story, but maybe we had better get something in the record about it. Was the work increased or decreased as to establishments, etc.?

Dr. **Mohler.** During 1921 there were 64 licenses issued to serum-producing plants for hog-cholera serum and virus.

Mr. **Anderson.** How many were there before that?

Dr. **Mohler.** Before? Practically the same number.

Mr. **Anderson.** Are these annual licenses?

Dr. **Mohler.** Yes; they are annual licenses.

Mr. **Anderson.** That represents the number?

Dr. **Mohler.** Yes, sir. For 1921, 64 licenses were issued for cholera serum and 34 licenses for the preparation of other products, like tuberculin, mallein, and other biologics of that kind. As 7 of these plants produced all kinds of products, there were really only 9 establishments licensed. During the last fiscal year there were prepared 322.656,488 cubic centimeters of antihog-cholera serum and——

Mr. **Anderson.** Is that an increase over the preceding year?

Dr. **Mohler.** No, sir; it is a decrease. In addition, 21,141,508 cubic centimeters of simultaneous virus were produced and tested under the direct supervision of bureau employees. About 62 veterinarians, 30 lay inspectors, and 10 clerks were on the inspection force during the last fiscal year. The number ranged from 91 to 108.

During the calendar year just passed there were produced over 476.000,000 cubic centimeters of hog-cholera serum. The number of employees on January 1, 1922, was 101, 57 being veterinarians, 33 lay inspectors, and 11 clerks.

Mr. **Anderson.** I want to get at whether the current year shows an increase in the number of establishments and the number of cubic centimeters of serum.

Dr. **Mohler.** There is a considerable increase for the calendar year compared with the fiscal year. Of course, that overlaps six months.

Mr. **Anderson.** Yes.

Dr. **Mohler.** There has been more produced in the calendar year of 1921 more than in the fiscal year 1921, as indicated by this figure of 476.000,000 cubic centimeters, but the number of licensed plants remains practically the same, there being only one less this year than last year.

Mr. **Anderson.** This is actual plant inspection during the process of manufacture, is it?

Dr. **Mohler.** Yes, sir; this is close, shoulder-to-shoulder inspection, such as is given animals producing meat in our federally inspected packing houses.

Mr. **Buchanan.** To determine whether or not the serum manufacturers are up to the standard?

Dr. **Mohler.** Yes; and to see that this material is prepared properly and tested out after it has been prepared. It is used on test pigs, to see that there are no dangerous or deleterious products put on the market.

Mr. **Anderson.** And also for potency?

Dr. **Mohler.** Yes; and also for potency.

Mr. **Lee.** How many private serum plants are operating in the country without Federal licenses?

Dr. MOHLER. I would say not more than five or six now. They are gradually decreasing. There used to be considerably more of what we call mushroom plants. That number has fallen off remarkably. There are not more than five or six.

Mr. ANDERSON. Are many of the States producing serum?

Dr. MOHLER. Not to the extent that they did five years ago. They have withdrawn. They can buy these products cheaper than they can manufacture them. There is a lot of serum on the market for 1 cent per cubic centimeter.

Mr. ANDERSON. Has the price decreased or increased?

Dr. MOHLER. Before this outbreak in October it went down fast. Then this rather serious outbreak came, and the firms that thought they had enough to last six months had all their product sold in six weeks. Then they put the price back again. They had attempted to keep it up to $1.25 to the consumer and $1 per 100 cubic centimeter to the jobber and the dealers, but they had so much on hand in October that the price broke seriously, and they sold it at from 75 to 80 cents a hundred. Then they had such a demand that they all sold out.

Mr. ANDERSON. How much do you use to the hog?

Dr. MOHLER. That, of course, depends somewhat on the size. As an average, I should say, about 40 to 50 cubic centimeters.

Mr. ANDERSON. That would make it about 50 cents per hog?

Dr. MOHLER. It depends upon the hog. The lighter the hog the less you use.

FOR RESEARCHES IN CAUSE, SPREAD, ETC., OF HOG CHOLERA.

Mr. ANDERSON. What are you doing under the item for research, $29,520?

Dr. MOHLER. Dr. Dorset is still at work on various hog diseases of an infectious character that simulate hog cholera. Just six months ago, with the assistance of our Dr. Henley, he perfected a process for reclaiming and clarifying serum; that is, impotent serum that has failed to pass the test on animals. He has found that by a system of chloroform treatment, he can reclaim such products, which means a big saving. That is one of the recent results from the expenditure of this money.

He is also investigating vaccines and bacterins now being widely used to protect hogs against various kinds of infections.

He is also working to confirm or disprove the results recently announced at the University of Illinois in connection with the botulinus poisoning of hogs because of the alleged presence of botulinus germs in the hog cholera serum from several plants. This is the kind of work that is being done with this fund.

We have a hog cholera farm out near Ames, Iowa, where Dr. Niles and several assistants are working on various problems in connection with hog cholera, and also in preparing enough hog cholera serum to enable our men to demonstrate in these 31 States when they need material to demonstrate with. We have to have a standard product so that we know exactly what it is. That is all made at Ames, Iowa, with this experimental fund.

But the outstanding feature of last year's work is this method of adding chloroform to this old, discolored serum in order to clarify and reclaim it.

FOR INVESTIGATION, TREATMENT, AND ERADICATION OF DOURINE AMONG HORSES.

Mr. Anderson. Let us pass to the item on page 36—necessary expenses for the investigation, treatment, and eradication of dourine.

Dr. Mohler. If I remember, we asked you to reduce this item last year by $10,000, and I think you took off $16,000.

This work is progressing just as nicely as it was last year, but we were slightly handicapped by this extra cut. The work is practically complete in all the States except Arizona and New Mexico. The Indian ponies are not causing us so much trouble as they did before. We had 22.000 samples of blood from those sections last year, with the result that the percentage of disease was reduced to 2.2 per cent.

Mr. Anderson. Did you kill the horses?

Dr. Mohler. We killed the horses and paid not to exceed $100 as indemnity to the ranchmen. Our average is far below that. The Indian Office paid for the Indian ponies out of their appropriation. We merely pay for the ranchmen's horses that become contaminated by contact with these ponies.

Mr. Anderson. Do you have inspectors examining horses in Arizona and New Mexico?

Dr. Mohler. Yes. We start in by the 1st of May. We have a force of probably 25 or 30 men. They look over the horses and take out the blood from the jugular vein and send the blood to Washington, where we make the same kind of tests that the Army does for syphilis in men. If the blood gives a reaction, we wire back that such and such a number is positive. They then have to have the infected animals slaughtered, and the owner receives indemnity. As stated, we do not have to pay indemnity to Indians for their Indian ponies.

Mr. Anderson. These suspected animals, I suppose, are segregated?

Dr. Mohler. Yes. They are segregated until our inspectors get back reports from us as to whether they are healthy or the reverse. The work has been going on for six or seven years. It starts with the spring round-up, and by August or September the routine work is done. We received thirty-five or forty thousand samples last year. We have boys from college helping us in the laboratories from June on. This is another reason for having our salary rolls flexible. The inspectors who do this field work in the summer time are transferred and do other lines of work during the other portions of the year.

Mr. Buchanan. What is the nature of the disease?

Dr. Mohler. It is a breeding disease, and is somewhat akin to syphilis in man. It affects the penis and the testicles of stallions and the genital tract of mares.

Mr. Buchanan. It gets into the blood, does it?

Dr. Mohler. It gets into the blood; yes, sir. You get the second and tertiary forms of this disease, like in human syphilis.

Mr. Buchanan. Then why not just call it syphilis?

Dr. Mohler. They do call it equine syphilis, but it is due to a trypanosome, while syphilis is caused by a spirochete.

BELTSVILLE (MD.) EXPERIMENTAL FARM.

CONSTRUCTION OF BUILDINGS.

Mr. **Anderson.** The next item seems to be one for Beltsville, Md.

Dr. **Mohler.** That comes under dairying, and Dr. Larson will take that up in a moment.

GENERAL ADMINISTRATIVE WORK, INCLUDING SALARIES AND TRAVELING EXPENSES OF EMPLOYEES.

Mr. **Anderson.** General administrative work, including traveling expenses and salaries of employees engaged in such work, etc.

Dr. **Mohler.** There is no increase in this item of general administrative work. It has been the same for several years. It stands the way it did last year.

Mr. **Anderson.** Just what is that general administrative work?

Dr. **Mohler.** It covers the work of the chief of the bureau, the chief clerk, the administrative officers in Washington, with the purchase of all the supplies and office fixtures, express charges, freight, telephones, etc., that are chargeable against the overhead of the entire bureau. It really takes care of the overhead of the administrative offices of the bureau.

Mr. **Anderson.** It is a kind of basket clause that catches everything that is not caught somewhere else?

Dr. **Mohler.** It is a lot of necessary expense that they have to charge to administration because there is no other fund to draw upon.

Mr. **Anderson.** Is there any printing paid out of this item?

Dr. **Mohler.** Not a cent.

MEAT INSPECTIONS.

Mr. **Anderson.** The next on page 38 is meat inspections. There is no increase in that item, is there?

Dr. **Mohler.** No, sir; it stands the same as it did last year.

Mr. **Anderson.** Are there any increases in salary under this item?

Dr. **Mohler.** No, sir.

Mr. **Anderson.** I suppose you can't cut that down $100,000 or so?

Dr. **Mohler.** No, sir. The slaughtering of livestock this year will not be as heavy as it was last year. I think it fell off 4.7 per cent. Now, in view of present conditions, it seems certain that instead of having a decrease of 4.7 per cent in slaughter next year, we are going to have a marked increased. So it certainly can not be cut any if we are going to inspect a heavy peak load next year like we had a year or two ago.

Mr. **Buchanan.** For the current year you used $791,000 of this appropriation?

Dr. **Mohler.** Yes, sir; we expect to keep within that limit this current year.

PERMANENT APPROPRIATION.

Mr. **Buchanan.** Where did you get that annual appropriation of $3,000,000?

Dr. **Mohler.** That is a permanent appropriation made by Congress in 1906.

Mr. **Anderson**. That is permanent. That is carried on from year to year.

Mr. **Buchanan**. It does not have to be reappropriated?

Mr. **Anderson**. No; it does not.

Mr. **Buchanan**. This is in addition to the $3,000,000?

Dr. **Mohler**. Yes, sir.

Mr. **Buchanan**. It is practically $4,000,000, then, is it not?

Dr. **Mohler**. There is a clerk's notice down toward the bottom of the page which explains the $3,000,000 for meat inspection.

Mr. **Anderson**. Are any salaries increased under this item?

Dr. **Mohler**. No, sir.

GROWTH OF APPROPRIATIONS FOR MEAT INSPECTION.

ANIMALS INSPECTED AND SLAUGHTERED.

Mr. **Buchanan**. Will you explain this to me: In 1914 the appropriation was $200,000; in 1915, $375,000; then, later, it went to $501,000 and dropped back to $477,000. In 1920, or since the war, it reached $903,000.

Dr. **Mohler**. Yes, sir.

Mr. **Buchanan**. It has been about the same ever since—$892,000 and $891,000.

Dr. **Mohler**. Yes, sir.

Mr. **Buchanan**. Is there any special reason why it should increase so rapidly? You notice that it doubled practically.

Dr. **Mohler**. It practically doubled between 1919 and 1920. The committee, in its wisdom, saw fit to increase salaries of our lower paid lay inspectors and veterinarians, and inasmuch as we had a great number of each class it soon ate up $400,000. That was an amendment by the Agricultural Committee to better pay the men who were getting these lower salaries in the meat-inspection service.

Mr. **Buchanan**. That difference in the salaries of employees constitutes the difference between $475,000 and $891,000?

Dr. **Mohler**. Yes; not $891,000 but $903,000; in other words, it is the difference between the appropriations of 1919 and 1920.

INCREASE IN WORK.

Mr. **Buchanan**. You have no more work to do now than then, have you?

Dr. **Mohler**. In 1919 we slaughtered more animals in the Federal inspected establishments than ever had been slaughtered in any year previously. The farmers generally raised more hogs, more sheep, and more cattle, as the result of the Government's desire to obtain a maximum of food material for war purposes; and we slaughtered over 70,000,000 animals that year.

Mr. **Buchanan**. In 1919?

Dr. **Mohler**. Yes. These faithful employees who were working in our meat-inspection service, and who did not go to the shipyards, ammunition factories, and steel mills, but stayed with us, were deserving of help, and Congress, desiring to help them by increasing their low wages, gave about $400,000 for this purpose.

Mr. **Buchanan**. This year how many animals did they slaughter?

Dr. Mohler. As yet we have no complete records for this year, but for the last fiscal year we slaughtered about 63,000,000 animals. The way the slaughter is going now we are going to fall off, as I said, about 4.5 per cent.

Mr. Anderson. From 63,000,000?

Dr. Mohler. Yes; but if this season's bumper crop of corn is going to be sold through feeding to hogs and cattle the slaughter of these animals, for the inspection of which this appropriation is to be made, will be greater this year by far. It will be more like the year 1920, when we slaughtered over 65,000,000 animals.

Mr. Anderson. My recollection is that there was some testimony that during that big year that we had when 70,000,000 animals were slaughtered we had many men working overtime.

Dr. Mohler. Yes; they were working from 12 to 14 hours every day. Some of them worked from 5 in the morning to 9 at night, Sunday included. Then they did not get any extra pay for their overtime.

Mr. Anderson. Do they now?

Dr. Mohler. They get overtime now. By provision of Congress they get overtime pay for work done beyond eight hours on a week day and for all Sunday and holiday work.

Mr. Anderson. Is there much overtime now?

Dr. Mohler. Yes; there is quite a great deal of it.

Mr. Anderson. Is it pretty expensive?

Dr. Mohler. It is somewhat expensive, I should say. I do not recall exactly, but I think it amounted to about $200,000 for last year. In other words, the force of 2,100 men that we have now in the meat-inspection service drew this amount from the Secretary of Agriculture, who had previously obtained this sum from the packers for the overtime they required of our men.

Mr. Anderson. That is not paid out of the appropriation?

Dr. Mohler. No, sir. That is a special provision put in the bill two years ago, which allows the Secretary of Agriculture to collect from the packers for overtime, and when the packers pay, the Secretary of Agriculture, through the disbursing office, pays to the men who have worked the overtime.

Mr. Buchanan. You do not happen to know, I suppose, how many animals were slaughtered under Government inspection in these houses in 1914, 1915, 1916, and 1917?

Dr. Mohler. I haven't the figures with me for those years, but I can get them for you. It is around 60,000,000. I do not know the exact figures. Would you like to have them all inserted in the record?

Mr. Buchanan. That is about the same as it is now and the same as it has been? The idea in my mind is that if they could inspect that many in those years, why not now? It seems to me it is the same amount of cattle for the same amount of money, except these salary increases.

Dr. Mohler. In the last fiscal year there were 62,252,442 animals of all kinds inspected. They were inspected in 892 establishments and in 265 different cities. I haven't the figures with me for the years preceding that.

Mr. Lee. Your record is for from July to July?

Dr. Mohler. Yes, sir.

Mr. Buchanan. You might put in the record the number of animals inspected for these years. It will not be much trouble, will it?

Dr. Mohler. No, indeed. They are in the annual reports and are as follows:

Number of animals inspected in—	
1914	57,033,401
1915	58,231,862
1916	62,304,522
1917	63,816,323
1918	58,726,443
1919	70,813,856
1920	65,232,805
1921	62,252,442

You see, Mr. Buchanan, many of these men, in 1914, drew $1,080 a year and were raised in 1919 to $1,320. Now, you will not argue the point with me for a moment, I know, that $1,320 to-day will not go as far as $1,080 did in 1914 or 1916.

Mr. Buchanan. I am not complaining about that at all.

Dr. Mohler. That is the reason for this sudden jump.

Mr. Buchanan. It is a greater increase than is due to the salary.

Dr. Mohler. As you remember, Mr. Chairman, the way the committee provided for these promotions was that there should be so many lay inspectors in certain grades who would get $180 increase. Inspectors in another grade were to get a similar promotion, and a certain number of veterinarians were to get from $100 to $200 increases. It was carried out exactly as the committee wished it.

Mr. Anderson. My recollection is that that increase carried a total of approximately $444,000. That is my impression.

Dr. Mohler. That is approximately the amount.

Mr. Buchanan. That is very close to it. To get to my point, the year preceding this appropriation was $477,000. That $440,000 would make it nine hundred thousand and some odd. The years that I asked about were all under $400,000.

Dr. Mohler. Yes. Are you recalling the fact that we get $3,000,000 in addition?

Mr. Annderson. Exactly. That is why I am inquiring about it. This appropriation keeps going up.

Mr. Anderson. My recollection is that there was a slight increase in salary as to some of these employees in the year preceding, or the two years preceding, the year that we went over this whole business.

Dr. Mohler. There was an increase of $157,120 in 1918, at the beginning of the war. Mr. McDermott and Mr. Wilson, of Chicago, brought in leters from the members of the force in Chicago. There was a little increase then, but the big increase occurred in 1920.

Mr. Buchanan. It may be that all of this increase in appropriation from $200,000 to $891,000 is caused by increase in salaries by legislative act of Congress. I do not know. I was just looking at those figures.

Dr. Mohler. If you would like for me to do so, I can incorporate that statement in the record, so that you will have it for your information.

Mr. Buchanan. I think the record should show it, because on the face of this it shows that it is growing by leaps and bounds.

Dr. Mohler. The statement follows:

In the estimates for the year 1918, submitted in the fall of 1916, the department asked for an increase of $215,540. It was stated that this sum should be used as follows:

For additional employees, 25 veterinarians and 72 lay inspectors	$96,600
For the promotion of 108 veterinarians and 735 lay inspectors	118,940
Total	215,540

The department's request was emphasized by Congressmen Wilson and McDermott, of Chicago, members of the Agricultural Committee, who presented numerous letters from their constituents and urged that an even greater increase be made. However, as the bill finally passed Congress, an increase of only $157,120 was made over the figures for the year 1917. Accordingly, it was not possible to make all the promotions desired, but as many as possible were made after taking care of the necessary increase in work.

In the original estimates for the fiscal year 1920, submitted in the fall of 1918 by the department, there was no increase in the item for meat inspection. However, when the estimates were before the Agricultural Committee, a letter dated January 9, 1919, and signed by Secretary Houston, then Secretary of Agriculture, was presented, recommending that there be added to the estimates the sum of $223,600. This amount, it was shown, would enable the department to promote 1,385 of the lower-paid employees of the meat inspection service in sums varying from $100 to $200 each. This proposition was before the committee when it met on January 14, 1919. The Hon. John W. Rainey, of Illinois, a member of the committee, was asked by the chairman to take charge of the hearing. Mr. Rainey first offered an amendment to the proposed appropriation bill, asking that the supplemental amount estimated for meat inspection be increased to $1,029,790. He stated that the Secretary of Agriculture had asked an increase of $236,600, which was to cover promotions of 1,385 employees, and added that his proposal was to go further and take care of the promotion of 2,950 employees. Mr. Rainey spoke at length, citing the general increase in living cost and the rise in wages in the packing houses and other industries. Several others were heard at the time, including Dr. W. Horace Hoskins, of the veterinary college of New York University; Mr. E. S. Bayard, editor of the National Stockman and Farmer; Dr. Peter F. Bahnsen, State veterinarian of Georgia; Dr. V. A. Moore, dean of the veterinary college, Cornell University; and others.

At the conclusion of the hearing the committee took the matter under consideration, and finally decided on the sum of $903,960 as the supplemental amount for meat inspection for 1920, an increase of $426,760. This amount was appropriated by Congress, and resulted in a general promotion of the low-paid employees throughout the service at the beginning of the next fiscal year.

Mr. Buchanan. I suppose there has been an increase in the men.

Dr. Mohler. I did not know whether you were recognizing the fact that we have only 2,100 men now, while we had 2,500 men back during the war period, and also that the $3,000,000 appropriation was being partially used for the salaries of all these men, in addition to this extra sum of $891,000.

Mr. Anderson. How many did you have in 1915?

Dr. Mohler. In 1915 we had more than the number we have now. The number of men had in 1915 was approximately 2,700.

Mr. Anderson. You had an increase in salary in two ways: That is, you decreased the number of employees and at the same time increased the annual appropriation.

Dr. Mohler. Yes; we had it both ways. We told our inspectors in charge that we could not get enough money for proper salaries by obtaining additional funds; that if they wanted to help us out they must reorganize their forces and make use of a number of cheaper men, with an extra-good man in charge, instead of working a larger number of average-grade men.

The idea was to put on one good man to supervise the work of three or four average men, rather than have five men of about the average ability. We put on more lay inspectors instead of veterinary inspectors, and had them supervised by a high-grade veterinarian. Thereby we reduced the number of employees on the whole, but we gave the fellows that remained with us more money—that is, both the lay and veterinary inspectors and the supervisors.

FOR INVESTIGATIONS AND EXPERIMENTS IN DAIRY INSPECTION.

Mr. ANDERSON. We will take the dairy items now. Let us take the dairy item on page 30, for all necessary expenses for investigations and experiments in dairy industry, etc. My recollection is we increased this item last year.

Dr. LARSON. The increases were used for the purpose of extending the work of breeding the dairy cattle and in investigations of by-products of the dairy; that is to say, the utilization of whey, skimmed milk, and condensed milk, which had not been undertaken before that. This breeding work that we have under way, we think, is the most fundamental work we can do in the dairy industry.

EXPERIMENTAL WORK IN BREEDING CATTLE.

Mr. ANDERSON. My recollection is—I have not had an opportunity to go over my notes of last year's appropriation bill—that we had this whole thing divided into three branches; that two of them were under way and that you were to bring the third one under way later.

Dr. LARSON. Yes. That was condensed milk.

Mr. ANDERSON. No; I am talking about the breeding proposition.

Dr. LARSON. Yes, sir.

Mr. ANDERSON. I wish you would tell us about that, so that I will get it straight.

Dr. LARSON. Most of our breeders believe that they must follow the principle of mating related animals. The method that is universally followed is called line breeding. This belief of breeders that line breeding must be followed is based largely on theory rather than on any definite principle which has been proven by right practices. What we want to determine is the correct method of breeding to follow in order to insure a uniform transmission of high production. We have planned experiments which should show definitely whether the mating of closely related animals, the mating of distantly related animals, or the mating of unrelated animals will get the most uniformly good results. In order to get the work under way we first secured animals for one project; the project in which line breeding was to be compared to direct outcrossing. We asked for additional funds to purchase another group of animals in which close inbreeding was to be compared with direct outcrossing. It is not only the purchase of these animals that entails additional expense, but the cost of keeping the daughters generation after generation to study their production.

Mr. BUCHANAN. Do you think that line breeding brings good results and shows improvement over cattle that have no blood relation?

Dr. LARSON. Practically every good breeder in this country practices line breeding. He thinks, of course, that is the best way, but we do not know that it is. Some of our people doubt that it is.

Mr. BUCHANAN. I do not believe there is a word of truth in it.

Dr. LARSON. But the point is that we have millions of animals being bred in that way.

Mr. BUCHANAN. You may have millions of animals, but I believe it would be just as well if they had not been related.

Dr. LARSON. We do know if the breeder line breeds and gets good results, he thinks that line breeding is the proper system to follow. If he line breeds and gets poor results, he is inclined to think it is the wrong method to follow. There have been no definitely planned projects in which line breeding and outcrossing from the same foundation stock have been carried on side by side. That is what we are planning to do.

Mr. BUCHANAN. I think in the long run you will ruin the cattle.

Dr. LARSON. That is just the point.. We are trying to see whether it does injure them or not. We have a definite project planned by which we can compare the effects of these methods of breeding absolutely, generation by generation, and year by year, as to all points; that is, as to size, production, constitution, fertility, and type.

Mr. ANDERSON. This last class has been brought in the last year?

Dr. LARSON. Yes.

Mr. ANDERSON. How many animals have you in this last class now?

Dr. LARSON. We have 36 foundation cows and 3 bulls in the inbreeding versus outcrossing experiments.

Mr. ANDERSON. How many have you in the other?

Dr. LARSON. We have 26 foundation cows and 2 bulls in the line-breeding versus outcrossing experiments.

Mr. ANDERSON. That number has increased considerably since the beginning, has it not?

Dr. LARSON. We now have, altogether, taking young and old stock, more than 100 animals.

Mr. ANDERSON. That is, in the three classes?

Dr. LARSON. Yes. The third class includes Jersey cattle, in which we are combining the blood of eight distinct unrelated Jersey families for the purpose of testing the "nicking" theory, which practically all breeders believe in, and to get some measure of the increased vigor of constitution and producing ability that is supposed to be the result of the crossing of unrelated strains.

Mr. BUCHANAN. I find no fault with that. As I understand it, your inbreeding project is for the purpose of determining whether or not that inbreeding ultimately will prove injurious to the cattle?

Dr. LARSON. Yes. It is to determine whether inbreeding will be harmful from the standpoint of constitution and fertility, and also to determine if by this method of breeding a greater proportion of uniformly high producing cows can be produced.

Mr. BUCHANAN. So that you can demonstrate that to the cattle raisers?

Dr. LARSON. Certainly.

Mr. ANDERSON. Has there been a large number of inbreeding experiments in the country?

Dr. **Larson.** There have been a number of inbreeding experiments with rats, guinea pigs, and other small laboratory animals, but no carefully planned inbreeding experiments with cattle in which outcrossing was compared, generation by generation, with inbreeding, using the same foundation stock. As a matter of fact, some of our best breeds of cattle have been founded and improved by close inbreeding. We know, however, if the animals have some weaknesses in type or constitution, that inbreeding will bring these weak points to the surface. We also know that the mating of unrelated animals is usually accompanied by an increased vigor of constitution and fertility. We do not know which method of breeding will get the most uniformly good results over a long period of time. Another phase of our breeding work which has not been mentioned before is the continued use of the proven sire for generation after generation.

Though breeders to-day do not give a great deal of attention to the use of proven sires in the herds, we are inclined to believe that the greatest improvement that has been brought about in our breeds of live stock has been through the wide use of some sire that had unusual ability to transmit high production and good type. It is a part of our plan, therefore, to use in some of our herds only bulls whose transmitting ability is known. By the continuous use of this type of sire, generation after generation, regardless of his relationship to the animals with which he is mated, we are hoping to eventually produce animals that will uniformly transmit high production. The point is that we are not in position to-day to state definitely to dairy cattle breeders or farmers whether they should mate closely related animals, whether they should mate distinctly related animals, or whether they should mate entirely unrelated animals, or whether they should depend entirely on sires with proven ability to transmit high production in order to get good results in their work.

Mr. **Anderson.** You feel that these experiments will be worth while?

Dr. **Larson.** Yes, sir; I feel sure they will. I was very much impressed at the National Dairy Show at St. Paul when the big breeders came around with enthusiasm about results that had been obtained so far.

Mr. **Anderson.** I know they were very much interested.

Dr. **Larson.** The point is, as I have said, that it is a definitely planned project. It is on a sound basis. Ten States have adopted this same plan and are cooperating with us and are furnishing material and records of their herds.

Mr. **Buchanan.** How many generations will it be before you determine results?

Dr. **Larson.** The more the better; but in two, three, or four generations we ought to have results. I may say that by close inbreeding with one breed, in three generations we found a great many defective animals.

Mr. **Buchanan.** They will all be defective after a few years.

Dr. **Larson.** Negative results, of course, are just as valuable.

Mr. **Buchanan.** Oh, yes; I agree with you on that. If the stock men who are inbreeding think that it is the right thing, very well. I agree to that. Some of us, however, have never adopted it.

Mr. **Anderson.** According to this allotment schedule quite a large amount of this increase was apparently used for dairy extension work. I wish you would tell us about that.

DAIRY EXTENSION WORK.

Dr. **Larson.** The dairy extension work has been decreased every year.

Mr. **Anderson.** This does not show it. This shows a total expenditure for dairy extension work in 1921 of $86,000, and an estimated expenditure for 1922 of $115,000, which does not indicate a decrease but an increase of approximately $30,000.

Dr. **Larson.** The figures, while correct, are misleading, because in 1921 the extension work carried on under the Dairy Farming Section, the Dairy Manufacturing Section, and the Western Dairy Section, was combined and the new section renamed the Dairy Extension Section. The original dairy farming section had research work also, and this was then handled by the Dairy Extension Section in addition to the extension work. The following are the allotments for purely extension projects from 1918 to 1922, inclusive:

1918	$164,365
1919	123,585
1920	106,235
1921	59,140
1922	57,220

Thus the dairy extension section in 1922 has an allotment of $115,385, but only $57,220 of this amount is for extension work, which really should be classed as "introduction" work. For example: We have been working on cheese of foreign types. Cheese being the largest importation we have of any dairy product. Before the war we had as much as 60,000,000 pounds of cheese coming into this country from other countries, and practically no other dairy product.

We have been working in the laboratories to perfect the manufacture of these products in our country, and our experiments have met with success, and we have improved these types of cheese, including Swiss, Camembert, Roquefort, and one or two of the Italian varieties. But when we do this in the laboratory it is not sufficient. We can not say to the manufacturer, "Now, here, we will show you how to do it." We feel that this cheese manufacture must be carried through in the factories, and that we must demonstrate it as a practical proposition. We have therefore placed in three or four factories men whom we have trained. I some of the manufacturing States these men have worked the entire season in the manufacture of cheese of foreign types and have demonstrated that it is possible to produce these products in this country.

We are making Swiss cheese in this country that is a great deal more uniform than that produced in Switzerland. We are making Roquefort successfully; in fact, more successfully than it was ever made except in a little Province in France.

These men go into the factories and show, on a factory scale, how such cheese can be made. We call this a step between the laboratory and the manufacturer, and after we have demonstrated our methods for a year or two and shown how the cheese can be made in the factory. we turn the work over to the States for them to carry on as extension work; our part is simply introduction work. This cheese work is put in our extension section of introduction section, as we call it now. It is really not extension work but the introduction of results obtained in the laboratory.

Mr. **Anderson**. I think it was the distinct understanding last year that the additional money which was appropriated under this item would not go into extension.

Dr. **Larson**. That is right.

Dr. **Mohler**. We do not now call it extension. It is really introduction work.

Mr. **Anderson**. It does not make any difference what you call it, if that is what it is.

Dr. **Mohler**. It is not usually considered extension work in other bureaus.

Dr. **Ball**. It does not go into the extension work that they were doing during the war period.

Dr. **Larson**. Our budget does not show it, but it has been decreased every year.

Dr. **Mohler**. That is the estimated basis.

Mr. **Anderson**. According to this allotment here, which I do not know anything about, it shows a decrease in items for dairy experiment farming between 1921 and 1922, and also a decrease in the dairy-cattle item between 1921 and 1922. My recollection is that these items in each case were allowed an increase.

Dr. **Larson**. The figures for the dairy experiment farm project are misleading. The estimate for 1921 was $65,000, but owing to the increased number of animals, the higher wages paid to labor, and high prices of feed, the expenditures were $81,500, and had to be met from the unexpended funds in other lines of work. Therefore, the allotment for 1922 is really an increase of $12,000 over the allotment for 1921.

It is a fact that we have decreased extension work for the last three or four years materially. The number of employees on field extension work in the past few years has been decreased as follows: In 1918 there were 62; in 1919, 57; in 1920, 45; and in 1921 there were only 15 employees, and these are working on extension work. We are now only doing this introduction work, which is really not extension work, but an intermediate work. As soon as we have demonstrated this on a commercial scale we let the State do the extension work.

Mr. **Anderson**. I can see the advantage of the introduction and the extension work, but I can not see this apparent reduction in the two items where I supposed this additional work was to be done. If these allotments are not right, they ought to be fixed up.

Dr. **Ball**. In the one on dairy breeding there was more money expended last year than the year before, except for the purchase of the original herd. There was $10,000 for the purchase of animals. That appears at the bottom of page 11.

Mr. **Anderson**. I may have the wrong year in mind.

Dr. **Mohler**. I know that what we have been doing has been to comply with your wishes, the wishes expressed by the committee last year, with reference to reducing extension work, not only in dairying but animal husbandry work also. We have changed this title from "extension" to "introduction," because it is neither extension nor research. Below will be found copy of memorandum making the change. We decided upon the adoption of the term "introduction" merely to indicate that it was neither research nor extension. We have cut out our extension work and laid off on June 30 last year some 30 or 40 men in the bureau.

DAIRY DIVISION.

DECEMBER 21, 1921.

Memorandum to the employees of the Dairy Division

A section to be known as the introduction section of the Dairy Division is hereby created, and to be effective January 1, 1922.

The sections heretofore known as the extension section and the dairy manufacturing investigation section will be discontinued, and the personnel of the two sections will be included in the introduction section. Mr. S. C. Thompson will be in charge of the section under the title. "In charge of introduction section," and Mr. E. V. Ellington will be associated with Mr. Thompson in directing the work of the new section under the title of "Associate in Dairy Introduction."

The work of the introduction section will include the work now being done by the extension and manufacturing investigation sections, except that projects which are now being conducted that would be considered general extension will be discontinued, and the cooperative work in the States will, as soon as arrangements can be adjusted, be conducted as introduction projects rather than general extension.

It will be the chief duty of this section to introduce new ideas of production, utilization, and manufacture, to improve methods of manufacture or new products. It will be the policy, for instance, to introduce the cultural methods of making Swiss cheese which have been worked out in the laboratories of this division. When these methods have been introduced in a limited number of factories within a State in cooperation with the State agencies, the work of spreading this throughout the State which is undersood to be extension, will be carried on by the State and not by this section. It is the purpose, in a similar manner, to introduce other products and methods of both production, utilization, and manufacture.

C. W. LARSON,
Chief, Dairy Division.

Approved:

J. R. MOHLER,
Chief of Bureau, Bureau of Animal Industry.

Mr. BUCHANAN. Have you anything to show the amount of work done under introduction work?

Dr. LARSON. Yes.

Dr. MOHLER. These are estimated amounts, of course. We can not tell what we are going to expend in 1922.

Dr. LARSON. For 1922 we expect to get along with less at the farm for actual expenses because of the decrease in salaries. Some 18 or 20 men are employed at the farm.

Mr. ANDERSON. That is the day labor force?

Dr. LARSON. That is the day labor force. That was decreased. On the breeding project we carry some of the expense for feed, because these animals are carried especially for the breeding project on the farm.

These estimates for 1923 are, of course, put at an increase and have been carried across, not knowing what the production would be at the farm. We may have a good yield of hay and corn. We have carried across the averages. We hope to increase the number of cattle. We have to get a bull or two now and then as this project goes on. The investigation work on the breeding project costs more every year because we have to carry these animals on.

Mr. **Anderson**. That is what I supposed, but apparently this does not cover it.

Dr. **Larson**. This statement while correct is misleading. It would have been better had the 1921 figures stated that they were amounts actually expended. In 1921 we had difficulty in securing men for extension work and several positions were left vacant. The money unused as a result of these vacancies was expended on research work instead. The following table shows a comparison of the amounts allotted in 1921, 1922, and 1923:

Project:	
Dairy extension, allotments—	
1923	$115,385
1922	115,385
1921	114,000
Spent $86,545.	
Project:	
Dairy manufacturing, allotments—	
1923	33,115
1922	33,115
1921	29,100
Spent $18,615.	
Project:	
Dairy research laboratories, allotments—	
1923	103,846
1922	103,846
1921	77,600
Spent $85,740.	
Project:	
Market milk investigations, allotments—	
1923	34,615
1922	34,615
1921	30,200
Spent $28,375.	
Project:	
Dairy experiment farm, allotments—	
1923	77,077
1922	77,077
1921	65,000
Spent $81,590.	
Project:	
Dairy cattle breeding, allotments—	
1923	10,962
1922	10,962
1921	9,100
Spent $20,635.	

Mr. **Anderson**. Apparently there is nothing transferred from dairy manufacture here, because the estimated expenditure for 1922 is considerably greater than the actual expenditure of 1921. You carried that amount over into 1923.

Dr. **Larson**. The additional amount is for cheese-factory management investigations.

Mr. **Anderson**. But you do not show it in these estimates.

Dr. **Mohler**. What you want to know is where the $50,000 went?

Mr. **Anderson**. Yes.

Dr. **Larson**. The increases in 1922 have been allotted for condensed-milk investigations (including $9,000 for equipping a laboratory at Grove City, Pa., for condensed-milk manufacture), butter and by-products investigations, nutrition investigations, and the maintenance of the Beltsville Dairy Farm; inasmuch as the number of animals in the breeding projects has resulted in increased expenditures for feed, labor, buildings, etc.

In that connection I would like to say that our studies show that in one of our breeds to-day practically all the animals trace to five great breeding sires, and of these five great breeding sires two are sons of one cow, and a third is a grandson of that same cow. Practically this entire breed as it stands to-day, has been improved by the remarkable breeding ability of these five great sires, and especially of the great transmitting ability of this one great cow.

Then, we are increasing the introduction work with respect to Roquefort cheese and the Italian cheese. But before we could do this we had to make a place for curing these Italian varieties of cheese, that must be cured for two years. We used about $3,000 to build a place in the attic where we could cure and keep the cheese for the necessary length of time.

BELTSVILLE, MD., EXPERIMENTAL STATION.

FOR CONSTRUCTION OF ADDITIONAL BUILDINGS.

A part of the increase is being expended for making a shed, an additional building at the Beltsville farm, where we can house the increasing herd. I want to point out that we have not been permitted to do any building at the farm for three years, although the herd has been growing and this work is very valuable. In order to keep this work, or in order not to lose it, we have had to keep the entire female progeny. No appropriation was made to take care of this increase in numbers and we were not permitted to build at all last year. This year we were permitted to put additions to buildings and we have added a wing on the open shed for the cows on the advance registry test and have put a temporary wing on one of the other barns to take care of the main herd. This has taken the balance of the money, and it was entirely for the breeding project, to house the additional animals and keep them from being outdoors this winter.

Mr. BUCHANAN. Where is this plant located?

Dr. LARSON. Beltsville, Md., about 13 miles from Washington.

Mr. BUCHANAN. How many acres in the farm?

Dr. LARSON. The bureau farm has 487 acres, of which 190 are used as a dairy farm.

Mr. BUCHANAN. The Government owns it?

Dr. LARSON. Yes, sir.

Mr. ANDERSON. How much was put in those buildings?

Dr. LARSON. I have not the exact figures in mind, but I should say in the neighborhood of $8,000 to $10,000.

Mr. ANDERSON. That answers my question.

Dr. LARSON. I would like to make a statement as to just how this has been expended by sections—breeding, manufacturing, and in the laboratories and sanitation.

Mr. ANDERSON. That is exactly what is supposed to be here. We have not that, and I would be very glad to get it.

Dr. **Larson**. I will show you over a period of years that what has been called extension has been reduced materially, and we would practically discontinue extension work and only do this introduction work.

Dr. **Ball**. Dr. Larson, can you furnish a statement show ing the separation of that work? It is evidently all furnished by your bureau.

Dr. **Larson**. Yes. The following are the allotments for purely extension projects from 1918 to 1922, inclusive:

1918	$164, 365
1919	123, 585
1920	106, 235
1921	59, 140
1922	57, 220

Mr. **Anderson**. Take up the item on page 36—$14,600—for the construction of buildings at bureau experiment farm at Beltsville, Md.

Dr. **Larson**. The silos are, of course, for the purpose of taking care of the additional herd. The herd is increasing right along.

Mr. **Anderson**. Have you any more stock you are raising out there?

Dr. **Larson**. Yes. Of course, we are getting a herd of calves every year.

Mr. **Anderson**. They do not raise anything to put into the silo?

Dr. **Larson**. We are putting more of the land into corn and less into hay, and buying hay, as we must do.

Mr. **Anderson**. How much have you got in corn out there now?

Dr. **Larson**. We have enough to fill four big silos.

Mr. **Anderson**. And you want two more.

Dr. **Larson**. Yes, sir; we think that is one of the best feeds we can grow out there, and it cuts down our feed bills the most of any feed we could raise.

Mr. **Anderson**. It is cheaper to raise corn than to buy hay?

Dr. **Larson**. We can not buy silage. We can buy hay.

Dr. **Mohler**. It becomes more productive.

Dr. **Larson**. The sewage plant is included because we are required by the State of Maryland to put in a sewage disposal plant there—that is, they prevent us from running our sewage into the streams that it has been running into without septic tanks. The shop and garage is necessary for the repairing of motor trucks required to haul the milk from Beltsville to Washington for the laboratories, also the cream that we sell. We have tractors, gas engines, pumps for fire protection, a gas machine for making gas for the laboratories and other machinery, and we have found that by employing a man we can cut down expenses very materially by doing our own repair work.

Mr. **Buchanan**. Repair of what?

Dr. **Larson**. Our trucks, tractors, and other machinery, including an ammonia compressor for refrigeration.

Mr. **Buchanan**. This shop does the repairing of tractors and farm machinery on the 190 acres of land?

Dr. **Larson**. Yes; 190 acres.

Dr. **Ball**. This is one part of a big farm?

Mr. **Buchanan**. What other farm?

Dr. **Larson**. This is only the dairy farm, and is separate from the animal husbandry farm.

Mr. **Buchanan**. Is there any other Government property that would be repaired in that shop besides that?

Dr. **Larson**. Special stalls and apparatus made for digestion trials in the nutrition of dairy cows.

Mr. **Buchanan**. You want $5,000 for this shop?

Dr. **Larson**. The shop and garage for repairs. We have a laboratory there employing 12 to 15 men.

Mr. **Buchanan**. A laboratory is one thing and your shop is another.

Dr. **Larson**. It is making equipment for it.

Mr. **Buchanan**. You make equipment in the shop for the laboratories?

Dr. **Larson**. Yes; part of it.

Mr. **Buchanan**. What sort of equipment?

Dr. **Larson**. For the digestion trials with cattle. We are studying the nutrition of dairy animals.

Mr. **Buchanan**. Are you making a shop for studying digestion of cattle?

Dr. **Larson**. Yes, sir; we are making devices for collecting urine and feces and separating them, making separate stalls, etc.

Mr. **Buchanan**. You do not need a shop to make stalls?

Dr. **Larson**. No; but it is economical to have a shop in which you can make these things as they are needed.

Mr. **Buchanan**. That is a question of 190 acres of land?

Dr. **Larson**. It takes 190 acres of land. This is an experiment station where we are conducting experimental research.

Mr. **Buchanan**. I am trying to find out what things you do to make repairs in a shop besides tractors and auotmobiles and plows, if you have any.

Dr. **Larson**. As I was saying, we have this equipment for the digestion work that we are constantly working in. We have an ammonia compressor, pump for fire protection, a gas-making machine, and a heating plant.

Mr. **Buchanan**. What character of instruments do you make in your shop to aid digestion?

Dr. **Larson**. We make devices for collecting urine and studying feeding experiments.

Mr. **Buchanan**. Containers and buckets?

Dr. **Larson**. Containers and special devices—stalls.

Mr. **Buchanan**. Stalls do not have anything to do with shops. An ordinary carpenter can make all the stalls you want.

Dr. **Larson**. But there are automatic devices of various kinds.

Mr. **Buchanan**. What are they?

Dr. **Larson**. It is difficult for me to explain just what they are. But we are making various kinds of pans and automatic devices so that we can collect these without disturbing the animals and to save labor.

Dr. **Mohler**. Making shaking machines, small-animal cages, etc.

Mr. **Buchanan**. Like a soda-water fountain?

Dr. **Larson**. We find it takes one man to watch three cows, collecting urine and feces, and that means a man per cow, because there is an 8-hour period in the 24-hours.

Mr. Buchanan. It takes one man to watch three cows?

Dr. Larson. He works eight hours.

Mr. Buchanan. Each works eight hours; then it takes a man to a cow?

Dr. Larson. That is right. By working out some devices for doing this we hope to increase that and cut down the expense. We have also been working on a device for putting our silage into silos with less expense, and we have worked on various devices for doing that.

Mr. Buchanan. Those devices are well established for putting silage into silos?

Dr. Larson. Not at all established.

Mr. Buchanan. They are in various parts of the Union.

Dr. Larson. We have used out there the past year a device for cutting up the silage in the field and running it into a wagon after it is cut.

Mr. Anderson. How much silage do you get per acre?

Dr. Larson. Around 10 tons.

Mr. Anderson. How much will one of these silos hold?

Dr. Larson. About 200 tons. These are only 14 feet. These are the summer silos for warmer weather.

Mr. Lee. They will only hold about 135 tons.

Dr. Larson. You are correct. They only hold about 135 tons.

Mr. Anderson. If you had six silos you could put your whole 120 acres into corn?

Dr. Larson. Not with the smaller silos as those are only 14 feet and hold about 135 tons each.

Mr. Buchanan. How many acres do you plant in silage crops?

Dr. Larson. That has varied. We have never had as much as we needed.

Mr. Buchanan. How many acres do you generally plant?

Dr. Larson. We have 70 to 80 acres of corn. It depends on the rotation and condition of our alfalfa, and so forth.

Mr. Anderson. You would not put this 190 acres into corn every year?

Dr. Larson. No; but we would grow more corn so that when we have a good year and we get a larger yield the silage can be carried over. This is economical; when you have a bad year you will not have nearly enough and it is advantageous to put up as much as we can because it is the cheapest feed we can put up. The silos will pay for themselves in the saving of roughage we have to buy in the poor years.

Mr. Buchanan. This experiment must be very intensive, a man to watch a cow all the time. That is more attention than a baby gets.

Dr. Larson. Yes; sometimes we give more attention to some of our animals than is given to some babies.

Mr. Buchanan. I forgot they are more important. Dollars and cents are mixed up there; there is nothing but a little humanity in a child.

Dr. Larson. If we have a dairy herd in this country worth a billion dollars we ought to make it just as efficient as we can, and when we realize that the average cow in the United States only produces half as much milk per year as the average cow of Denmark, Holland, and those countries, we have something to do in this country. We find that production largely depends on the efficiency of our cattle. If we can improve the efficiency of these cattle by feeding and breeding, we shall be able to produce our dairy products very much cheaper than we are producing them now and we shall be able to compete with other countries.

FARM EQUIPMENT.

Mr. **Anderson**. How many trucks have you?

Dr. **Larson**. We have two.

Mr. **Anderson**. Tractors?

Dr. **Larson**. One tractor.

Mr. **Anderson**. Any automobiles?

Dr. **Larson**. Not that are owned.

Mr. **Anderson**. Passenger automobiles?

Dr. **Larson**. No, sir. But we have five men out there, scientists who go there in cars and would be left out in the weather unless they were housed.

Mr. **Anderson**. Do they all have cars?

Dr. **Larson**. Five of them have. It so happens that some of these men are fortunate enough to have made some money before they became investigators.

Mr. **Anderson**. You have a wagon shed, 1-story concrete, 24 by 102 feet. What are you going to do with that?

Dr. **Larson**. That is to store all our machinery and wagons, etc., to keep them out of the weather.

Mr. **Buchanan**. How many wagons have you?

Dr. **Larson**. We have three wagons or four. We have two manure spreaders, and then the other implements, such as corn harvesters, cultivators, etc.

Mr. **Buchanan**. You have some horses or mules to shoe?

Dr. **Larson**. Yes, sir; and we shoe them there on the farm in the old shed at the present time.

Mr. **Buchanan**. Then you have a sort of shop there now?

Dr. **Larson**. Yes, sir. It is very inadequate, of course—there is a building there that we use, a temporary affair.

Mr. **Buchanan**. What sort of a building is that?

Dr. **Larson**. That is just simply a shed used as a sort of storage place when some building operations were going on out there in the first place.

Mr. **Buchanan**. Has it walls around it? You said a shed.

Dr. **Larson**. Yes, sir.

Mr. **Buchanan**. Then it is a small house.

Dr. **Larson**. I would not know how to differentiate between a shed and a house; it is just a frame affair.

Mr. **Buchanan**. I understand a shed is something that has no walls around it, but just top over it.

Dr. **Mohler**. I would like to say this: We have a dairy farm at Beltsville adjacent to our large animal-husbandry farm of over 300 acres, and if we get this amount of money the shop would do regular repair work on trucks, machinery, etc., of the animal-husbandry farm which now have to be taken into town to be repaired. We will send them to this shop or garage and have all the work of repairing done there if this money is appropriated. It will cover the repair work of machinery at the dairy farm as well as for the animal-husbandry farm.

Mr. **Anderson**. You would not have but one or two men in this shop.

Dr. **Mohler**. No; but it will cover the work for the dairy farm as well as the animal husbandry farm.

Mr. **Anderson**. Any time you have more than they could do for one farm they would not be available for the other farm?

Dr. **Mohler**. That is possible.

The other item that I want to call especial attention to is the sanitary sewage-disposal plant. It is absolutely compulsory for the department to put up that kind of a sewage plant, because the State board of health has requested us to do it. We are not now complying with the laws of sanitation of the State of Maryland, and it is almost mandatory that we find some sanitary way of disposing of our sewage in order to be on the right side of the State Board of Health of Maryland.

Mr. **Anderson**. Does this sewage plant take care of anything except this dairy proposition?

Dr. **Mohler**. It will take care of some portions of the animal husbandry farm as well as the dairy farm. The objectionable sewers are all connected and the sewage coming down goes into the main stream that goes through the town of Beltsville.

Mr. **Anderson**. Is there a poultry farm there, too?

Dr. **Mohler**. Yes; but that will not be connected with the sewage-disposal plant.

Mr. **Anderson**. Is this sewage plant large enough to take care of three farms?

Dr. **Mohler**. The poultry farm is included with the animal husbandry farm of three hundred and odd acres. There is nothing on the poultry farm that is objectionable from the health standpoint.

Mr. **Buchanan**. What makes your experimental farm come within the prohibition of the sanitary laws of Maryland? What element is there about it? Is it the cattle?

Dr. **Larson**. It is the sewage from the barns; and besides that, there are some 30 people who stay on the farm, and that all goes into the sewage.

Mr. **Buchanan**. Are there not hundreds of farms in the State of Maryland with 30 people which do not have sewage-disposal plants?

Dr. **Larson**. I do not assume there are, unless they have some provision to take care of it.

Mr. **Buchanan**. This is in the country?

Dr. **Larson**. In the country; but it would hardly be practicable to get that class of men to live under conditions under which they would use privies and have no bathrooms or anything of that sort.

Mr. **Buchanan**. Well, if they are from the country you could, but if they are city bred you could not. I just wanted to know why we contravened the laws of Maryland by not having this disposal plant. whether it was something that arose from the cattle or from the manufacture or experiments or your shops or your laboratories, or human beings.

Dr. **Mohler**. I think it is on account of the nearness of the farm to the village of Beltsville. We have the village near by on the Baltimore & Ohio Railroad, and, as Dr. Larson has said, there is a lot of the waste of the chemical laboratories being poured out into this stream as well as the effluvia of the people and the animals.

The particular objection is our proximity to the village of Beltsville. At any rate, I know it is a critical question between the State board of health and the bureau, because we have not this sewage disposal system, and I think we ought to get the funds so that we can comply with the State board of health regulations. That is the sole reason. So far as we are concerned we are very glad to dispose of our material the way most farmers do, but the State board of health asks us to do something different.

Mr. **Buchanan.** This is a ruling of the State board of health with reference to this particular place?

Dr. **Mohler.** Yes.

Dr. **Larson.** We assume it is because of the quantity. If you had just one family on a farm and had a cesspool to run the sewage into, there would not be any kick; but with the great quantity we have we can not run it into a cesspool; it will not get away.

Mr. **Buchanan.** Have you one on the farm?

Dr. **Larson.** We have an outlet and we run it into the stream at Beltsville.

Mr. **Anderson.** Does this stream run through the village?

Dr. **Mohler.** Yes; down the main road.

Mr. **Anderson.** Let us now take up the animal husbandry item on page 31.

Dr. **Mohler.** Yes.

FOR INVESTIGATIONS AND EXPERIMENTS IN ANIMAL HUSBANDRY.

Mr. **Anderson.** Page 31, "For all necessary expenses for investigations and experiments in animal husbandry," etc.

You have an actual increase in this estimate over the current appropriation of $10,220. What do you want to use that for?

ANIMAL GENETICS.

Mr. **Sheets.** There are three items covered in this increase. First, we have $1,500 for animal genetics, which covers the subject of animal breeding.

Mr. **Anderson.** What is the difference between this animal genetics here and the experiments in the dairy end of it?

Mr. **Sheets.** I can speak for this work, which has to do with the breeding of beef cattle, hogs, sheep, horses, and poultry, while, of course, the dairy breeding, I presume, has been covered. This has to do also with what you might call the working out of fundamental problems in animal breeding, which is at the present time based upon the work with guinea pigs. They do not eat near as much as other pigs and you can keep so many more in the small quarters. There are some fundamental problems in breeding that are being worked out with them.

Mr. **Anderson.** This is guinea-pig experiment?

Mr. **Sheets.** Yes; partially guinea-pig experiment, and the increase is asked to enable the senior animal husbandman who has charge of genetics work to supervise in a way the tabulation of the breeding data that has been collected or accumulated, we might say, for a period of years in the breeding of poultry, sheep, hogs, and other live stock. The provision is for maintaining and operating a sorting, tabulating, and a card-punching machine to make those tabulations instead of having this man do them himself, or employing other labor to do it. This machine will cost $100 a month. We can not get enough stenographic or other clerical help to do that work anywhere near as economically.

FARM, HORSE, AND MULE INVESTIGATIONS.

The item of $4,500 for horse and mule investigations is for continuing the study of the farm-power investigations which are under way in cooperation with other bureaus of the department. The amount recommended merely provides for the addition of a competent animal husbandman in the field to pay the expenses of making these studies and tabulating results.

Mr. ANDERSON. Is this work to be done in the field?

Mr. SHEETS. Yes, sir; practically all of it. It is necessary that the animal husbandmen do it from the standpoint of studying the subject of horses as a source of farm power; to assist with this work from the fact that it is not alone a power question as considered by public roads; it is not a question of farm economics alone as considered by the office of Farm Management and Farm Economics. It is an animal industry question also in that it involves the question of production of horses for animal power which can be used for all draft purposes on the farm and of the reproduction and maintenance of horses on the farm.

Mr. ANDERSON. What is this man hoping to find out by running around over the country?

Mr. SHEETS. They have a number of farms where records have been taken as to the amount of plowing, seeding, and other operations that have been done with horses and with tractors. These are farms where both horses and tractors have been kept. The idea is to determine, if possible, the size farm that should purchase a tractor for agricultural purposes and to try to determine just how far will the horses be displaced by the tractor. It is not to foster an argument between the tractor owner and the horse owner, but it is to see how far horse power may be supplemented by tractor power and to determine the most economical power unit for each farm operation.

Mr. ANDERSON. I understand that the Bureau of Public Roads has a man that goes around and does this thing. Dr. Taylor, of Farm Economics, has a man to do the same thing. Now you want a man to do it.

Mr. SHEETS. We have already had a man for a short time detailed to that work. They have made observations from 286 farms in the corn belt alone. There has been a committee appointed in the Department of Agriculture involving these three bureaus to study this problem. There has been a considerable demand for it from all sources, and it has been quite a problem to determine just how far the tractor will replace horses.

Mr. **Anderson**. The only thought I had about it is that it seems to me it might be well to get this all in one place, instead of scattered out in three or four places in this bill. The mere fact that this man happens to be an animal husbandman does not necessarily require separating him over here in this item, instead of putting him somewhere else where you can tell what his job is going to cost when you get through.

Dr. **Mohler**. There would be no objection if you would provide an item somewhere else, as, for instance, under public roads, for an animal husbandman at this salary to cooperate in the study of this problem.

Mr. **Anderson**. If this man is put on here now in this item to do this particular job he will be here when I am dead and gone, probably. If he goes on for just this particular job we might get rid of him when he gets through with that job. I do not know, but at least we will have some chance. My impression is that it is just as well to get it all at one place so we will know how long it is going to last and when it is through.

FARM POULTRY INVESTIGATIONS.

Mr. **Sheets**. An increase of $4,220 is called for under farm poultry investigations. This is for completing the equipment and conducting of investigations in calorimeter studies, which have as their object determining why in the hatching of chickens so many of them die in the shell about the seventeenth to the nineteenth day of incubation. This increase also is to provide a chemist and other labor, together with the necessary chemicals and small items of equipment necessary in conducting these investigations. Most of the equipment has already been provided, which consists of a calorimeter and the other necessary apparatus. The basement of the incubator house has not been designed for taking care of this work.

Mr. **Anderson**. Do you have the equipment now or does it have to be set up?

Mr. **Sheets**. We have most of the equipment, I suppose four-fifths of it, including the calorimeter. The only items needed would be such as the chemicals and the smaller items of equipment necessary in conducting work of this nature. This work was started in cooperation with the Office of Home Economics, States Relation Service, before the war or in the early part of the war and was discontinued due to the pressure of other things.

Mr. **Anderson**. How long is this job going to take?

Mr. **Sheets**. The fact that the chicken dies in the shell from the seventeenth to the nineteenth day has been known for many years. As to just why has never been found out. If I could answer your question I would be glad to do so, but I am unable to do it. I should say that in a period of a very few years there ought to be much fundamental information on this subject, as it is planned to carry it out. It is responsible for probably 25 per cent of the deaths of chickens in eggs that do not hatch but die in the shell.

CLARK COUNTY EXPERIMENTAL STATION, IDAHO.

Mr. **Anderson**. Is this Clark County station carried by this appropriation?

Mr. **Sheets**. Id

Mr. **Anderson**. Yes.

Mr. **Sheets**. Yes, sir.

Mr. **Anderson**. That comes under the sheep and goat investigations.

Mr. **Sheets**. Yes, sir.

Mr. **Anderson**. There was $8,000 for buildings the last year. That was a new item last year. How was that expended?

Mr. **Sheets**. That was expended as follows:

Horse barn	$3,000
Extension to lambing sheds (including granary, cow stable, and adjoining paddocks)	2,550
Construction in connection with lambing sheds:	
Shearing shed	1,200
Silo	750
Dipping vat	500
Total	8,000

CONSTRUCTION OF STORAGE RESERVOIR, ADDITION TO SUPERINTENDENT'S RESIDENCE, FENCING, ETC.

Mr. **Anderson**. What additional construction do you expect to build with this $8,000?

Mr. **Sheets**. The sum of $8,000 will be needed for the construction of a storage reservoir, the fencing some important pasture lands, and an addition to the superintendent's residence, as follows:

Storage reservoir	$3,000
Fencing	3,500
Addition to superintendent's residence	1,500
Total	8,000

Mr. **Anderson**. My recollection is that when this was estimated for last year, $18,000 it carried at that time in addition to the lambing sheds, horse barns, and cow barns, some kind of a reservoir as an insurance against fire, and also a house for the superintendent. Is that contemplated in this $8,000?

Dr. **Mohler**. We asked for $18,000 last year, and had we gotten $18,000, a portion of that would have been used for a big concrete reservoir for water supply and also in case of fire. We wanted to build an addition to the home of the foreman to be used for his office, so that he would not have to entertain his herders in his dining room as he does now. It was also intended to complete fencing; that should have been built last year, and to erect some lambing sheds, but we only got $8,000, so we did not complete the fencing, and we did not put any addition to the foreman's home. Neither was the reservoir built, as we could not go on the basis that we asked for, because we got less than half of the money. I know some of the lambing and shearing sheds were put up, but a lot of the fencing was left undone. This fencing is to be completed with this appropriation if we get it.

Mr. **Anderson**. What I am trying to get at is that the whole job evidently contemplated last year $18,000. You got $8,000 last year and want $8,000 this year. When we find out what you did with that $8,000 last year and what you propose to do with the $8,000 this year we will know where we are at.

Dr. **Mohler**. The money has not all been expended yet. We can put in the record what has been done with that $8,000, as much as has been expended this current year.

Mr. **Anderson**. You know how much you expect to build with it?

Dr. **Mohler**. Yes, sir. We want $3,500 of the sum we are asking for now to complete the fencing. That will put fences around part of the range where we need fencing, and the balance is to be put into a water-storage reservoir that has not been built yet, and an office for the manager alongside of his home.

Mr. **Anderson**. You built the lambing sheds last year?

Dr. **Mohler**. We built all the lambing sheds we need for the present. This flock of sheep consisted of 2,000 last year. It is increasing right along. We are expecting to get a flock of sheep of 4,000. The plan was to spend $54,000 to get a proper equipment, at the rate of $8,000 a year. That was the policy of the department in asking for $18,000 last year, but we only got $8,000.

RANGE SHEEP INVESTIGATION.

Mr. **Anderson**. You forgot to tell us about this three-year program last year.

Dr. **Mohler**. I think it was explained that this equipment was absolutely essential for a band of sheep of that size, about 4,000 individuals.

Mr. **Magee**. How many sheep have you?

Dr. **Mohler**. Two thousand.

Mr. **Magee**. I recall there was some proposition to double that flock of sheep, but I never was quite committed to it myself.

Dr. **Mohler**. We have a new breed out there, called the Columbia, that we established by cross-breeding, as we call it, and it is in considerable demand. Many sheepmen want to get individuals of this new breed.

Mr. **Lee**. Is that the breed you imported?

Dr. **Mohler**. The breed we imported was the Corriedale breed. No; this is a cross of the Lincoln and Rambouillet.

Mr. **Buchanan**. Is this another scientific farm?

Dr. **Mohler**. Yes.

Mr. **Buchanan**. How many acres in it?

Dr. **Mohler**. There are about 11 townships, 28,000 acres. It is in the arid section of Idaho and the land was withdrawn by the Land Office at the request of President Wilson.

Mr. **Buchanan**. How many sheep have you on it now?

Dr. **Mohler**. He have 2,000. We are doing considerable experimental work in growing sunflowers to put into silos to make sunflower ensilage for these sheep. We get a larger yield per acre from sunflowers than from a great many of the other crops that will not grow well in a dry country.

Mr. **Anderson**. Do they attempt to raise some of their own feed out there? Is the plan working?

Dr. **Mohler**. Yes, sir; it is working very satisfactorily.

Mr. **Sheets**. We had about 300 tons of sunflower ensilage at the beginning of the winter.

Mr. **Buchanan**. What do you feed it to?

Mr. **Sheets**. To the sheep.

Dr. **Mohler**. This is on the sheep range. Sheep are the only animals we are raising there.

Mr. ANDERSON. I think we had better get this whole plan, if we can.

Mr. SHEETS. For your information, if it is desired, I will state the buildings that have been put up at the Du Bois station: Foreman's cottage, pump house, sheep shed, horse barn, shepherd's cottage, bunk house, ice house, poultry house, and horse shed. That includes all the buildings at that station. That does not include the reservoir, an addition to the superintendent's residence, and the fencing, the items I mention as being needed and for which this $8,000 will be used.

Mr. ANDERSON. What is contemplated in this additional flock of 2,000 sheep?

Mr. SHEETS. This number will be obtained as a gradual increase, to be able to have units that are comparable to bands of sheep run on the range in that section, to try to solve the problems that are confronting the sheepgrowers there.

Mr. BUCHANAN. You do not need 2,000 sheep to conduct any character of experiment or experiment to improve the breeds of sheep?

Mr. SHEETS. This work is divided up into three phases. They are range management, grazing, lamb production, wool studies, and different phases of breeding. The crossing of the Rambouillet and the Lincoln to produce the Columbia, which is a new breed that would withstand the conditions in that area and at the same time produce a desirable carcass and fleece, is an example of the breeding work being carried on at this station.

Mr. ANDERSON. This whole thing is a range experiment?

Mr. SHEETS. Yes, sir; and the reason we are doing it on this scale is that there is nothing like it anywhere in the world so far as we know, certainly not in this country, planned to work out the sheep problems of the semiarid region, including the formation of this new breed for that particular section and to improve the Rambouillet and other breeds grown there.

Mr. BUCHANAN. I understand that by improving breeds we get a breed suitable for climatic conditions in that semiarid section, but what I want to know is why do you need 2,000 more sheep to do that? Is that just to take up the land or to have a sufficient amount to pasture your land, or is there any purpose served in the breeding?

Mr. SHEETS. We have at the present time the three breeds—the Columbia, the Rambaullet, and the Carriedall.

Dr. BALL. It would increase returns considerably compared with the expense.

Mr. BUCHANAN. That is what I have heard before. I have never seen returns.

Dr. BALL. Our receipts from all sources are about $6,000,000 a year, $2,000,000 of which are received and expended for cooperative work.

Mr. BUCHANAN. From that place?

Dr. BALL. No, sir; from all parts of the country. During the fiscal year 1921 the appropriations in the agricultural bill amounted to $31,712,784, the receipts $4,342,373, making the net appropriations

$27,370,410. (See statement below showing this information by bureaus:)

Statement of appropriations by bureaus contained in the agricultural bill for the fiscal year 1921, the receipts collected in connectcion therewith, and the net appropriations.

Bureau or office.	Appropriations.	Receipts.	Net appropriations.
Office of the Secretary	$770,926.00	$7,823.16	$763,102.84
Office of farm management	375,390.00	59.55	375,330.45
Weather Bureau	1,876,550.00	8,667.91	1,867,882.09
Bureau of Animal Industry	5,623,656.00	39,433.93	5,584,222.07
Bureau of Plant Industry	3,034,394.00	7,836.93	3,026,557.07
Forest Service	6,295,822.00	[1] 4,005,759.97	2,290,062.03
Bureau of Chemistry	1,333,591.00	3,344.95	1,330,246.05
Bureau of Soils	542,215.00	13,898.73	528,316.27
Bureau of Entomology	1,523,460.00	1,182.08	1,522,277.92
Bureau of Biological Survey	785,885.00	11,735.38	774,149.62
Division of Accounts and Disbursements	49,820.00	....	49,820.00
Division of Publications	374,090.00	1,162.06	372,927.94
Bureau of Crop Estimates	318,656.00	17.50	318,638.50
Library, Department of Agriculture	54,480.00	....	54,480.00
States Relations Service	4,870,160.00	7,047.16	4,863,112.84
Bureau of Public Roads	515,020.00	7,145.64	507,874.36
Bureau of Markets	2,538,709.00	166,803.57	2,371,905.43
Insecticide and Fungicide Board	147,350.00	34.89	147,315.11
Federal Horticultural Board	682,610.00	60,420.41	622,189.59
Total	31,712,784.00	4,342,373.82	27,370,410.18

[1] In addition to this amount the sum of $2,000,000 was received and expended for cooperative work as authorized by law.

Dr. Mohler. This range alone turned in $11,000 from the sale of young stock sold in Salt Lake City and of the wool that was disposed of at different places.

Mr. Buchanan. You will have to prove it to us.

Dr. Mohler. We told that to the committee last year, and I think the figures were included in the hearing. We sold lambs and sold wools amounting to $11,000 in one year.

Mr. Buchanan. I am willing to vote money to improve breeds or anything that will aid agriculture, but I have a prize to offer for any Government institution on any scale taking all facts into consideration that makes a profit.

Dr. Ball. We did no say anything about profit.

Mr. Buchanan. Therefore, I am going to support all necessary appropriations to advance scientific investigations improving different strains of stock that will improve and better stock that will suit this climate or that climate. But I do not want to buy any more stock than is necessary.

Mr. Anderson. As I understand this proposition, it is, in the first place, a range experiment. The whole proposition involves the determination of certain factors of good range conditions.

Mr. Sheets. Yes, sir.

Mr. Anderson. One of these is the possibility of raising and providing necessary feed on that dry area.

Mr. Sheets. That is one of the first things; to make the sheep ranch self-supporting.

Mr. Anderson. Another factor is the problem of breeding to those conditions.

Mr. Sheets. Yes, sir.

Mr. **Anderson**. What is the third one?

Mr. **Sheets**. Studies in lamb production. That is in a way breeding, but it is also housing and flock management. The average flock in that area will raise 60 per cent lamb crop. In our system of management we have been able to get a 90 per cent lamb crop, and that is simply because of breeding, housing, and handling the sheep. The other factors have to do with grazing studies, such, for example, as deferred grazing to reseed and improve the sod, also the method of handling the sheep on the range in and best means of protecting them during certain dry or unfavorable seasons.

SWINE EXTENSION WORK.

Mr. **Anderson**. You have an allotment under this item of $53,000 for swine investigations. Where are they conducted?

Mr. **Sheets**. Practically all of that work is conducted at Beltsville and in cooperation with about 10 State experiment stations in the study of soft pork.

Mr. **Anderson**. Are you making any headway with those experiments?

Mr. **Sheets**. The soft-pork study has been going for two years. The study up to this time has to do with trying to find the fundamental reasons for soft pork. That includes the feeding, what causes it, and then some possible or practical means of correcting this condition in the hog by feeding corn, for instance, or other feeds. It is well known that such feeds as peanuts and soy beans are among those which produce soft pork. By feeding corn or other feeds along with them during certain stages of fattening it was thought possible to harden or maintain a firm carcass. Whether that could be done in a practical way was a question, especially in a region where peanuts were grown largely and used as a feed for hogs.

Mr. **Anderson**. You have not discovered any way of doing it yet?

Mr. **Sheets**. No; I do not think the work has gone far enough to reach a definite conclusion as to fundamental causes for soft pork. The chemical question involved is a rather complex one. We know less about the oils, for instance, the fats of animals, than we do of most other animal tissues. As to why certain feeds cause the fats to be soft in the case of pork and, further, some practical means of correcting it has not been satisfactorily answered yet.

Mr. **Buchanan**. Do you think you can answer that question in common sense by peanuts and things of that sort, which fatten hogs faster than corn and have more oil in them, and therefore the hog fattens faster than by corn?. Is not one of slow growth harder than one of quick growth?

Mr. **Sheets**. That is not the question involved. They are taking oil out of these feeds which are used for pork production. Even though they take the oil out there remains still something that tends to cause this pork to be soft and not like the corn-fed pork. If hogs, for example, are grazed upon soy beans or other such leguminous crops, the pork is not of as good quality as that produced on corn or some other combination of feeds of which corn is a large part. They have found from some experiments in Canada that hogs produced there on rations pretty largely of corn are not as good as those produced on similar rations of corn in this country. For example, we do not yet know the limitations of the soft-pork question. In fact, it is a question that has been a puzzling one for a long time, but no solution has been found. I think two years is pretty short for the solution of a problem that is as old and as complex as this one.

Mr. **Anderson.** Has the cottonseed-meal problem been solved? My recollection was that there was some difficulty with cottonseed meal two years ago, poison or something.

Mr. **Sheets.** They are finding it. They have largely solved that question for most animals except hogs. We have found other feeds for hogs that are more satisfactory, such as fish meal, tankage, and feeds of that nature. Cottonseed meal is used only in limited quantities for limited periods.

FARM HORSE AND MULE INVESTIGATION.

Mr. **Anderson.** What character of horse and mule investigations have you been making under this item?

Mr. **Sheets.** The farm horse and mule investigation, the item covered partially in the increase asked for, has to do with the farm power studies, and we have been conducting in a small way some investigations relating to mule production and horse production. There is $4,350 for that particular study; for the breeding of horses at Buffalo, Wyo., $4,180; and breeding Morgan horses, $19,960. That is the Morgan Horse Farm at Middlebury, Vt.

Mr. **Anderson.** I thought we were through with that.

Mr. **Sheets.** That covers all of the horse-breeding work. I understand that is what you asked.

FOR MORGAN HORSE-BREEDING INVESTIGATION.

Mr. **Anderson.** I may be wrong, but my impression is that we quit the Morgan horse proposition.

Dr. **Mohler.** We stopped the military horse-breeding work, or remount work. That money was withdrawn last year.

Mr. **Anderson.** We are still carrying on this Morgan horse business?

Dr. **Mohler.** Yes. We had about six Morgan stallions in military remount work, and they were given to the War Department by the Department of Agriculture, and, of course, there is no further expense to this bureau in connection with those horses. The Morgan horse-breeding work has been continued under this item and has not been reduced.

Mr. **Anderson.** These horse and mule investigations carry an allotment of $9,000 for salaries, $6,000 traveling expenses, and $7,900 equipment and material. Can you tell us what the cost of maintenance of the Morgan horse proposition is?

Mr. **Sheets.** It is $19,960.

Mr. **Anderson.** Is that conducted wholly by the Government?

Mr. **Sheets.** It is. The Vermont Experiment Station, of course, consults with the department officials as to certain features which they refer to in that State, but they contribute nothing to its maintenance.

Mr. **Anderson.** Is that Morgan horse farm owned by the Government?

Mr. **Sheets.** It is.

Dr. **Mohler.** The farm contains about 1,000 acres. A large percentage of it was given to the department by Col. Battell and some of it was purchased. Speaking precisely there are 952 acres, of which 435 acres were donated by Col. Battell, in 1907, and the remainder was purchased by the act of Congress March 4, 1917.

Mr. **Lee.** What are you trying to do, improve the breed?

Mr. **Sheets.** One of the main reasons for it is to maintain the Morgan horse for what it can contribute to the light-horse industry of the country. The Morgan is one of the breeds of horses which, owing to its vigor, stamina, and soundness of legs, has qualities that are essential in developing horses of endurance, like the military horses. This is a stud where such a breed is being maintained. There are very few breeding establishments in this country that maintain Morgan horses.

Mr. **Anderson.** How many stallions have you up there now?

Mr. **Sheets.** Three mature stallions, 20 brood mares, and enough young animals to make a stud of about 65 head.

Mr. **Anderson.** I recall this is the place under which the mares are reeding with the understanding that the Government or somebody an buy them at $100, or something like that?

Dr. **Mohler.** That is the old military horse breeding work, where he Government reserved the right to get the colt for $150, or, waiv-g that claim, the farmer obtained the colt for nothing. The farmer uld cancel this option at any time by paying a service fee of $25.

Mr. **Anderson.** How do you do it up here at the Middlebury, Vt., tation?

Dr. **Mohler.** At Middlebury the farmers go to the farm with their mares or these stallions are placed at important towns near by during the breeding season. We have at the present time only three mature stallions. Six were turned over to the War Department. In addition to the three mature stallions, there is a promising 3-year-old stallion coming along, a very promising 2-year-old stallion, and two outstanding yearling colts.

There are about 20 brood mares, with a number of fillies and yearlings running around, 65 or 70 all told.

Mr. **Anderson.** That is not very many horses to make a farm, is it?

Dr. **Mohler.** If you saw the granite and marble and the kind of soil up there you would realize that it is not a very productive farm. But remember that we bought 500 acres for $13,000, and the property that we bought had good brick buildings on it. It is not very expensive land. We also have a big flock of farm sheep up there, and we have some Ayrshire cattle. We try to keep a good many acres for producing the necessary feed for the Morgan horses.

Mr. **Andeson.** There was something the matter with the proposition. I do not know what it is, but I never could see behind it. I think it is, next to the military-horse proposition, the worst that I know of, this Morgan horse farm up there at Middlebury, Vt. It is just for a lot of horses that nobody wants.

Dr. **Mohler.** We sold some to Japan for $500 and $1,000 apiece.

Mr. **Anderson.** Why don't they use breeders and breed them?

Dr. **Mohler**. They are being bred every year.

Mr. **Sheets**. They are not too small for most of the purposes that a horse is demanded for in rugged country such as is found in New England. One of the ideas in that work is to improve the horse; first in the average height and the average weight, and we have made some progress in that. For instance, the figures from 1911 to 1921 show that the mature stallions have increased from 14.3 hands to 15.1½ hands in height, and from 1,025 pounds to 1,200 pounds in weight.

Mr. **Lee**. That is, harness horses?

Mr. **Sheets**. They are used for both harness and saddle purposes.

Mr. **Lee**. I will tell you the reason for that is that they are too small.

Mr. **Sheets**. That is it, except for rough country or for saddle purposes.

Mr. **Lee**. When they drive, now, they drive automobiles.

Mr. **Buchanan**. The day of the horse is numbered. By the time you get this experimental work completed they will not be using horses.

Dr. **Mohler**. That is the trouble. People are using Fords, not horses.

Mr. **Lee**. As time passes machinery will get better and better, and the horse will go.

Mr. **Anderson**. What I am getting at is this. Let us be perfectly frank about it. I do not think there is any economy in operating a farm that is not good for anything—to make something out of. That is not good farming. I can not see any economy in carrying on a proposition of this kind that does not get anywhere. It does not seem to me it is getting anywhere.

Dr. **Mohler**. The Morgan horse work could be combined with diarying, as it would make an elegant dairy farm. It has good clean spring water. They have plenty of ice for shipping the milk in summer time and it is an ideal dairy location.

Mr. **Buchanan**. You have plenty of alluvial soil to raise feed for the cows.

Dr. **Mohler**. Yes.

FARM POULTRY INVESTIGATION.

Mr. **Anderson**. Tell us something about this poultry business.

Mr. **Sheets**. The poultry investigation covers three items, farm poultry investigation at Beltsville, pigeon and squab investigations at Beltsville, and southwestern poultry investigations which are carried on at Glendale, Ariz.

The Beltsville investigations in farm poultry include three phases of work, poultry feeding, poultry breeding, and incubating and hatching studies which I have previously mentioned. The number of fowls maintained for those purposes at Beltsville is approximately 2,000. The breeding work involves the use of 1,400 hens, with individual records kept of the breeding and egg production. One of the objects is to increase the egg production and as a result we have a flock of white Leghorn hens pens of which average close to 200 eggs in a season. That is considerably above the average experimental flock. Of course, that has been partially due to selection; it is not breeding alone, and partially due to feeding. Many of these same hens that are maintained in the breeding pens are also on feeding tests, utilizing different feeds in comparison to standard rations for certain purposes at different seasons of the year.

Mr. **Anderson**. Have you had any results of these investigations in the last year?

Dr. **Mohler**. The investigations during the last year covered feeding work, and a bulletin on feeding hens for egg production was published in November, 1921.

Mr. **Anderson**. Is there any other item in this?

Dr. **Mohler**. Not in this.

Mr. **Anderson**. Mr. Wason wanted to ask you something about the tuberculosis item.

Dr. **Mohler**. Dr. Larson would like to discuss this item on page 271, which is for the dairy division largely

VAULT FOR REFRIGERATING PLANT.

Mr. **Anderson**. Page 271, vault for refrigerating plant, for the construction of a vault for the housing, and the transfer to and installation therein of the machinery and apparatus of the refrigerating plant of the Bureau of Animal Industry.

Dr. **Larson**. I think the chairman is quite familiar with that. We discussed it last year. We have in the east wing of the department several refrigerators and rooms in which temperatures are controlled. In the making of the various products, cheeses, and butter and also in the making of cultures of various kinds, refrigeration is needed, also in other devices of our bureau refrigeration is needed for purposes of keeping and also making various serums and cultures that are used.

For this purpose we have a small refrigerating plant in the subbasement, a room that has no outlet except upstairs, and it is damp, poorly ventilated, and it is difficult to keep machines running down there, and, besides, it is very dangerous; that is, the ammonia compressors are liable to explode any time and occasionally do, and if anyone should be there at the time they would be in danger of their lives. But more than that, ammonia fumes are constantly coming up in the various laboratory rooms from these refrigerating machines and hence destroy a great deal of our chemical work. We are asking for this appropriation to construct a building just outside of the main east wing of the department, near the Twelfth Street entrance, where these machines will be housed and given better care.

Mr. **Anderson**. Is this $25,000 to cover anything except construction?

Dr. **Larson**. Yes; it includes moving the machinery and installation. All that is necessary in connection with it.

Mr. **Anderson**. Do you expect to use the same machinery?

Dr. **Larson**. Some of it; yes, sir. One of them now is practically rusted out because of the damp place.

Mr. **Anderson**. What I am getting at is this: Is the $25,000 going to pay for the job, or will we have to make another appropriation later for additional machinery?

Dr. LARSON. My understanding is that this covers everything; the complete outfit—moving equipment and all new equipment.

Mr. ANDERSON. Is there any estimate as to the cost of construction and cost of the equipment, and so forth?

Dr. LARSON. You mean separate?

Mr. ANDERSON. Yes.

Dr. LARSON. Yes, sir; that has been worked out carefully.

Mr. ANDERSON. I wish you would put the estimate along with your testimony showing the estimated cost of the vault, new equipment, cost of moving old equipment, and making connections, and so forth.

Dr LARSON. Yes, sir; that has been summarized as follows:

Building and insulation of cold-storage rooms	$11,998
New equipment, piping, etc	8,002
Moving, installation of old and new equipment	5,000
	25,000

Mr. ANDERSON. If there is nothing else we will meet to-morrow morning at 10 o'clock.

JANUARY 31, 1922.

BUREAU OF PLANT INDUSTRY.

STATEMENTS OF DR. WILLIAM A. TAYLOR, CHIEF OF THE BUREAU OF PLANT INDUSTRY; DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK, DEPARTMENT OF AGRICULTURE; AND DR. KARL F. KELLERMAN, PHYSIOLOGIST AND ASSOCIATE CHIEF OF THE BUREAU OF PLANT INDUSTRY.

INCREASES IN SALARIES—CHANGES IN DESIGNATIONS.

Dr. TAYLOR. Mr. Chairman, in the statutory salaries there are certain changes included in the estimate, most of which are conversions of the lower places into a smaller number of somewhat higher salaries.

That does not apply to the salary of the chief of the bureau, which I understand the Secretary will discuss. It does not apply to the estimated increase of $250 to the officer in charge of publications. Our recommendation here is for an increase from $2,250 to $2,500. This is the case of a very excellent man of long service, who prepares the manuscripts of the Bureau of Plant Industry, which constitutes one of the largest publication items in the departments.

Mr. ANDERSON. Well, let us see. You intend to change that?

Dr. TAYLOR. The only change is an increase of $250.

Mr. ANDERSON. That was submitted last year, as I recall.

Dr. TAYLOR. I think it was; yes, sir. The second increase is that of an artist.

Mr. BUCHANAN. That is the third increase?

Dr. TAYLOR. The third increase; yes, sir; an artist at $1,620. We recommend his increase to $2,040. It is about the middle of page 40. This is an increase of $420 to an artist who has been at this salary for years and has been grossly underpaid. The man in any commercial rating is a man who is worth under any recent schedule of employment up to $2,500.

Mr. **Anderson**. Is this the man that paints pictures of the apples and the peaches?

Dr. **Taylor**. No, sir. This man does chiefly microscopic drawing and microphotography. He is in the laboratory of Plant Pathology. He does the work of illustrating the publications of Dr. E. F. Smith and his associates. It is very difficult, technical work.

Now, the other cases in our statutory rolls consist of three places that appear in the estimates as new places: Executive assistant, $2,500; foreman gardener, $1,800; and executive clerk, $2,250; a total of $6,550.

These place changes involve changes of title merely in the case of one administrative assistant in seed and plant distribution at $2,500, where we propose the title of "executive assistant," the title as it stands——

Mr. **Anderson** (interposing). Is that the gentleman who has charge of the congressional distribution?

Dr. **Taylor**. He is the man who conducts the correspondence in connection with the congressional seed distribution, and the title as it stands in the current appropriation act was the result of amendments and changes, which, as they finally came out of conference last year, did not accurately describe his work.

He is an executive assistant and has charge of the correspondence of the congressional seed distribution. He is not related to the plant-distribution work of the department. This is Mr. O. F. Jones, who handles the congressional seed correspondence.

Mr. **Anderson**. Now, if you eliminate the congressional distribution, does this place go with seed distribution?

Dr. **Taylor**. That is for the committee to say. We can use this place very advantageously in the bureau's administrative work. It is, however, as it stands, exclusively devoted to the congressional seed distribution.

Mr. **Buchanan**. Is the change in this title to executive assistant? Is that the reason that you suggest by reason of the fact that seed distribution may be eliminated?

Dr. **Taylor**. No; this change in title is merely a restoration to the former title?

My recollection is that this position was stricken out last year in the House. It was reinserted in the Senate with an increased salary and a broadened title, and the title remained, but the increase of salary did not, and we would like to get it back to the former basis.

Mr. **Anderson**. Of course, if seed distribution remains, this man then, I suppose, would remain; if seed distribution does not remain, you could use him in some other job—some other work?

Dr. **Taylor**. Yes, sir.

Mr. **Anderson**. All right.

Dr. **Taylor**. The next change is where we ask the change in the title of Landscape Gardener to "Foreman of Gardeners," at $1,800.

The major duties of the man in this position are as foreman of gardeners of the department here in Washington; no change of salary involved.

The apparent increase of one executive clerk at $2,250 involves merely a change of title from "Officer in charge of records," at $2,250, to "Executive clerk," at $2,250. No change of salary is involved.

Mr. ANDERSON. Is that in lieu of this official in charge of records?

Dr. TAYLOR. Yes, sir.

Mr. BUCHANAN. In lieu of what?

Dr. TAYLOR. That is in lieu of the officer in charge of records, which is stricken out.

Mr. BUCHANAN. "Landscape gardener, $1,800; officer in charge of records, $2,250."

Dr. TAYLOR. Officer in charge of records, $2,250.

Mr. ANDERSON. That is a change of title?

Dr. TAYLOR. Yes; that is merely a change in title.

Mr. ANDERSON. It is a change in title.

Dr. TAYLOR. Yes, sir. Then we ask for 10 clerks at $1,200 each, a total of $12,000, in place of 5 clerks at $1,080 each; 7 clerks at $1,020 each; and 5 messengers or laborers at $480.

We ask for the conversion of these 17 lower salaried places into 10 clerks at $1,200.

Mr. ANDERSON. How many vacancies have you now in the clerical places below $1,200?

Dr. TAYLOR. We have a varying number which I can not give you the figures on this morning. I could ascertain by telephone. It varies up and down, being due to a continued procession of appointments through these lower salaried places.

Mr. ANDERSON. Is the turnover in the places below $1,200 very much in excess of those above $1,200?

Dr. TAYLOR. On the statutory roll; yes. In fact, the turnover in those places below $1,200 is practically a continuous turnover so far as clerks possessing any stenographic qualifications are concerned.

We get them from the Civil Service Commission, hold them for a little while, until they can find something better and they leave us; so that their period of service with us is comparatively short. The following statement shows the turnover:

Statement showing turnover in statutory salaries in the Bureau of Plant Industry during the fiscal year 1922.

Below $1,200:	
Places	276
Separations	107
Percentage	38.7
At $1,200:	
Places	107
Separations	22
Percentage	20.5
$1,200 and over:	
Places	215
Separations	30
Percentage	13.9
Present statutory vacancies below $1,200	16

Mr. ANDERSON. Well, all the positions are not stenographic positions, are they?

Dr. TAYLOR. The majority of the clerks in the Bureau of Plant Industry have stenographic qualifications. We have very few that do not. Our requirements for clerks without stenographic qualifications are very light, so that we feel the pressure of the continuous breaking-in of clerk-stenographers for technical work very severely.

Mr. BUCHANAN. Well, let me see if I understand you clearly. You are asking for 10 clerks, at a salary of from $1,000 to $1,200, and at the same time cutting out 12 at $1,080; is that correct?

Dr. **Taylor.** No; we are cutting out five clerks at $1,080, seven clerks at $1,020——

Mr. **Buchanan** (interposing). Cutting out five?

Dr. **Taylor.** Five clerks at $1,080.

Mr. **Buchanan.** Yes.

Dr. **Taylor.** Seven clerks at $1,020, and five messengers or laborers at $480.

Mr. **Buchanan.** You are cutting them out?

Dr. **Taylor.** Yes, sir.

Mr. **Buchanan.** Well, 5 and 5 make 10, and you have 17. Then, you are cutting out 17 employees?

Dr. **Taylor.** Yes, sir.

Mr. **Buchanan.** In consideration of the increase in salary for 10 and——

Dr. **Taylor** (interposing). No; we are converting these 17 places that are below $1,200 into 10 places at $1,200.

Mr. **Buchanan.** What is the difference in the expense to the Government, if any?

Dr. **Taylor.** The total of the 17 places is $14,940.

Mr. **Buchanan.** And the other is $11,000?

Dr. **Taylor.** The other is $12,000; 10 clerks at $1,200 each.

Mr. **Buchanan.** Your estimate says $1,100.

Dr. **Taylor.** The net financial effect of this conversion will be the provision of 10 clerks at $1,200, a total of $12,000, in lieu of 17 clerks and messengers at smaller salaries, amounting to $14,940, a saving of $2,940.

Mr. **Wason.** I understood you to say 12. You now say 10.

Dr. **Taylor.** Ten clerks at $1,200, a total of $12,000.

Mr. **Wason.** That will be a saving of $2,940?

Dr. **Taylor.** $2,940; yes, sir. The total financial change in the statutory roll as recommended would involve a net increase over the current year of $230.

Mr. **Buchanan.** That includes the increases in salaries?

Dr. **Taylor.** Yes, sir; and the conversion.

Mr. **Wason.** Those salaries are statutory?

Dr. **Taylor.** These are statutory.

Mr. **Wason.** They would be subject to a point of order.

Mr. **Anderson.** The $1,200, of course, would be fixed by law.

Mr. **Wason.** But the one that I am talking about now would be.

Dr. **Taylor.** There are three increases before——

Mr. **Wason.** For instance, take the first change; that is a statutory change to $2,250.

Dr. **Taylor.** An increase from $2,250 to $2,500.

Mr. **Wason.** Suppose that we make that $2,500. That would be subject to a point of order, would it not, Mr. Chairman?

Dr. **Taylor.** Yes; I think so, under the present rule.

Mr. **Buchanan.** I understand that the committee will not recommend an increase in salary in any of these bills. That was our instructions on the District Committee, and I suppose that it is going to be in this committee.

Mr. **Wason.** That has been our policy on the subcommittee that I just came off of.

Mr. **Buchanan.** It has been on the one that I have just come off of, too.

Mr. **Anderson.** If there is nothing further on that, I think we will take up the next item, "General expenses, Bureau of Plant Industry," on page 42. There is no change in the wording of this paragraph?

Dr. **Taylor.** No, sir.

FOR INVESTIGATION OF PLANT DISEASES AND PATHOLOGICAL COLLECTIONS—INVESTIGATION OF SOFT ROT IN POTATOES, ETC.

Mr. **Anderson.** We will take up the item on page 43, "For investigation of plant diseases and pathological collections, including the maintenance of a plant-disease survey," etc. You have asked for an increase of $10,000.

Dr. **Taylor.** The item on page 43 is for the investigation of plant diseases and pathological collections, including the maintenance of a plant-disease survey, provided that $10,000 of this amount shall be used for research in brown rot and kindred diseases of peach trees.

The estimate is for a total of $82,000. The increase of $10,000 is requested to enable the department to undertake an investigation of soft rots of vegetables in the hope of discovering methods of control through which heavy losses that are experienced in various market gardening and truck-growing sections of the country occur.

This applies especially to Irish potatoes, where in some years the damage done by these soft rots, the nature and method of controlling which has not been worked out, is very heavy.

The work is handled by Dr. Erwin F. Smith, who is the head of our pathological force and whose work has been in the past very successful in the field of serious bacterial diseases of crop plants. He is, I think, without doubt, the leading specialist in the country on these bacterial diseases of plants.

Mr. **Anderson.** Is this a new disease?

Dr. **Taylor.** It is a disease, the existence of which has been known for several years, which occurs in destructive form frequently, although not every year. The department has been able only to make incidental observations of it in connection with the prosecution of other authorized work.

Mr. **Anderson** Does it appear in a given locality or in general?

Dr. **Taylor.** So far as known it is a disease which occurs destructively in one section one year and then for some reason not so destructive the next; it may appear in another section the next year.

So little, however, is known of the disease, other than its extreme destructiveness when it does occur, that not much can be said about it.

Mr. **Anderson.** It affects root crops?

Dr. **Taylor.** It affects root crops, especially potatoes, attacking, however, in some cases such soft, leafy crops as lettuce and some similar crops.

Mr. **Wason.** How does it work; what do you call it?

Dr. **Taylor.** It is known merely as "bacterial soft rot," and until fuller details of its life's history are known.

Mr. **Wason.** It causes soft rot in the potatoes; does it?

Dr. **Taylor.** Yes, sir; the potato when inoculated from diseased potatoes in the laboratory will slump down inside of 48 hours into a slime and mush and collapse, in distinction from the fungus dry rots of the potato which are due to an entirely different cause.

Mr. **Anderson.** This is not a disease, of course, which occurs after they are gathered?

Dr. **Taylor.** It is a disease, the inoculation of which is probably in the field, although the effect of the slump may occur while the potatoes are in the bin.

Mr. **Wason.** After the potatoes are put in the bin and the disease develops there would it inoculate other potatoes in the bin?

Dr. **Taylor.** I do not know whether this one will or not. One fungus disease which is known as leak and which is supposed to be confined to the California tule lands enters only through cuts or bruises such as occur in digging or handling. When that disease once starts in a sack or a carload of potatoes the slime that oozes and drips from the potatoes that were infected in the field gets communicated to any number of wounded potatoes that it comes in contact with. I do not know whether this organism can puncture a perfectly sound potato skin or not.

Mr. **Buchanan.** Is this more of a local disease dependent upon the soil conditions, place or places, a seasonal condition of a particular tract of land, and is it not a fact that on the same farm you may find this soft rot in one patch of potatoes and maybe four or five hundred yards away potatoes will make well and be free from it?

Dr. **Taylor.** That might be the case, although I do not know whether that is so or not.

Mr. **Buchanan.** That is my experience with it; I do not know anything about the scientific side of it.

Dr. **Taylor.** This rot is not the root rot that occurs in the cotton fields in Texas. It is not a continuing soil infection, so far as known. What I say here is subject to revision as a fuller knowledge of the life history of the organism is obtained.

Mr. **Buchanan.** That statement applies to everything in life.

Dr. **Taylor.** This is something which our people have not done more than to look over; incidental to other work. It is an important disease.

Mr. **Wason.** When did you begin to work on it?

Dr. **Taylor.** The only work that has been done has been incidental work during the last few years.

Mr. **Anderson.** How many men have you put on this?

Dr. **Taylor.** This would involve the full attention of two or three men and their field expenses.

Mr. **Anderson.** All right, we will take up the next item.

Mr. **Lee.** Does this disease occur in any section; I did not understand?

Dr. **Taylor.** So far as known; it is not continuously destructive in any section, but has been observed this year in one section; next year in another. It is not one of the continuing soil infections so far as present knowledge goes.

INVESTIGATIONS OF BROWN ROT, ETC., IN PEACH TREES.

Mr. **Buchanan.** Before you leave this, let me ask you why you have this proviso "that $10,000 of this shall be used for research in brown rot and kindred diseases of peach trees"? Why do you single that out from all other plant diseases? Is it something that compels the department to do it, or what?

Dr. **Taylor.** This $10,000 proviso was added to the appropriation act for the current year by the Senate and it was outside of the estimates submitted by the department last year.

Mr. **Buchanan.** Outside of the estimates, but not outside of the scope of your work? It is, of course, in general line with your work?

Dr. **Taylor.** Yes, sir; it was added at the very insistent request of the Georgia peach industry, which in the year 1920 suffered very heavy losses from brown-rot and one or two other diseases of the peach.

Mr. **Buchanan.** Well, is it necessary to still extend the work or have you completed the work?

Dr. **Taylor.** No; that money became available only at the middle of last summer.

Mr. **Buchanan.** I did not know how long it would have to be in there.

Dr. **Taylor.** The work is well under way, and we have every reason to expect we will have important results from it.

I will say this to the committee, that this proviso logically belongs in the appropriation for diseases of orchards and other fruits, but we can use it here. The administration of it is assigned to the specialist who administers the item on page 44.

Mr. **Anderson.** All right; if there is nothing more on that, we will take up the paragraph on page 44.

Mr. **Wason.** If you will permit, I would like to find out what sections this rot you have been describing occurs in.

Dr. **Taylor.** What section has been troubled with it?

Mr. **Wason.** Yes, sir.

Dr. **Taylor.** This potato rot has been observed in New Jersey; on Long Island; to a less extent in Aroostook County, Me.; in the Norfolk district of Virginia; on the Chesapeake Penisula, where the early potato production is important; and to an extent in the State of Michigan and the State of Minnesota; but not continuously year after year in any of these places. So far it is a seasonal disease, you can say.

Mr. **Wason.** You do not know what it starts from?

Dr. **Taylor.** It starts from the bacteria, but beyond that little can be said. It can be transferred. The potatoes inoculated with matter from these diseased potatoes, inoculated by a needle or placed on a fresh cut in the surface, discolor and soften down into just a slimy slush within two or three days.

Mr. **Wason.** Then, I judge from your statement that more caution should be used with the seed potatoes?

Dr. **Taylor.** We do not know much about that.

Mr. **Wason.** But you do know that much.

Dr. **Taylor.** There is no evidence of damage through seed potatoes yet.

Mr. Wason. I mean it does not reach the potatoes where they have been removed into seed-potato bins.

Dr. Taylor. I do not know.

Mr. Wason. You would hardly expect your observations regarding it would not satisfy you or lead you to believe that it would reoccur or is in the land year after year and would develop year after year.

Dr. Taylor. That may be possible, depending upon the arrival of just the right kind of a combination of temperature and moisture.

INVESTIGATION OF DISEASES OF ORCHARD AND OTHER FRUITS, INCLUDING DISEASES OF THE PECAN.

In the next paragraph, "for the investigation of diseases of orchard and other fruits," the proviso that $8,000 of said amount shall be available for the investigation of diseases of the pecan is stricken out and the language modified to read "including the diseases of the pecan." The estimate provides an increase of $7,000.

This is the paragraph under which all of our investigations of diseases of fruits and nuts are prosecuted, including the diseases that attack the growing crop on the trees and vines and those which are chiefly troublesome in the processes of handling, storing, and marketing the product.

The increase of $7,000 that is estimated here is to make possible the effective continuance of expert pathological advice and instruction to the inspectors of the Bureau of Markets who inspect and issue certificates upon demand of either the shipper or receiver when carloads of fruit and vegetables arrive at destination in bad order.

This constitutes the technical, biological side of that work, and is proving to be an increasingly effective way of accomplishing improvement in the practices of marketing as well as of growing these crops. It makes it possible to inform the grower just what it was that spoiled his product before it reached the market and to help him take the necessary steps to prevent future losses from that cause.

Mr. Anderson. This has to do particularly with diseases that develop or affect the fruit which develops during shipment, or does it have to do with diseases that occur during production, or is there any way of separation?

Dr. Taylor. Frequently it is a disease which becomes comparatively troublesome during the processes of marketing. It often roots back into conditions in the field, but frequently it becomes conspicuous after the fruit leaves the tree. When harvested there may be no deterioration visible, except to the eye of the specialist. The farmer looks at his peaches as he picks them and packs them and they appear sound. There may be, of course, a few scattering mummy fruits on the trees and the weather may have been showery and the temperature right for the rot or fungus and the spread of its spores, but the fancy fruit that he picks and packs and put into the refrigerator car looks all right.

If the temperature in transit is such as to favor the development of that fungus, the fruit may arrive three days later at the market showing anywhere from 10 to 50 per cent deterioration from brown rot.

Mr. LEE. Well, you are studying all of these things anyway, and I do not just see, unless you have the nature of the extension of work of some kind bring these people together, I do not see where this is any different from what you are doing, anyhow.

Dr. TAYLOR. It is different only in the place where the study is made and the relation that that bears to the movement of the product and to the consumer.

Mr. LEE. Well, you would not expect to have a specialist located at all of these shipping centers to diagnose these diseases when they appear at the receiving point?

Dr. TAYLOR. No, sir; that would not be necessary. We do feel that it is highly important to have two such men in position to study them, and we have them stationed at New York and Chicago, the heaviest receiving points, and in position to go quickly to any other important receiving point where any serious loss appears, as this technical determination of the identity of the disease has to be made within a few hours if it is to be made effectively—within a few hours after the opening of the car. The determination by these specialists is communicated to the inspectors of the Bureau of Markets, who, of course, are reporting upon many other things and can not be trained plant pathologists. There are not enough such to go around.

Mr. ANDERSON. Well, now, you expect to discover that kind of growth, so that any course necessary to be taken by him can be taken?

Dr. TAYLOR. The discoveries made are reflected back to the grower very quickly, frequently by telegraph through his own representative or commission man or, if the grower is in an exchange, through the exchange representative, so that if any steps can be taken immediately with respect to the removal of the cause of the disease they can be taken immediately and understandingly.

The other way in which it is reflected back is through our own force and back into our own force of investigators who are stationed—the small number that we have—at various places in the field, possibly remote from where this particular trouble is acute at that time. It enables them to shape and plan their research work and experimentation in the field much more promptly and effectively than could be done if we awaited information merely through the summarizing of the results of the season's shipments. It may save us a year in such cases, and often enables us to put out special emergency circulars or press releases that are immediately effective.

INCREASES IN SALARIES, TRAVELING EXPENSES, EQUIPMENT, SUPPLIES, ETC.

Mr. WASON. This increase is for salaries and traveling expenses, etc.?

Dr. TAYLOR. Yes ,sir.

Mr. WASON. This is statutory?

Dr. TAYLOR. No, sir.

Mr. ANDERSON. And for your traveling expenses you estimate an increase of $3,500?

Dr. TAYLOR. Yes; that is the figure.

Mr. WASON. And your increase for equipment and material is $1,000; stationery and office supplies, $100; for telephone and telegraph service, $100; for miscellaneous items, $120. Your miscellaneous item amounts to $4,413 for the year 1922; that is your estimate?

Dr. TAYLOR. Yes, sir; that is on the total of the paragraph, including this increase.

Mr. WASON. But you expended in 1921 almost $10,000 in miscellaneous items.

Dr. TAYLOR. $9,963.11.

Mr. WASON. Well, it is near enough to call $10,000, is it not, doctor?

Dr. TAYLOR. Yes, sir.

Mr. WASON. Now, with this increase of employees, the increase of traveling expenses, why would not your miscellaneous items increase?

Dr. TAYLOR. We do not foresee any increase there. Of course, we have to have this in mind, in a project like this, that a forecast made in the summer of 1921 of what may be required to meet exigencies occurring in the spring of 1923 is an impossible thing to be accurate about. The best that we can do is to guess on the basis of our general experience, leaving out years of unusual emergencies and basing it on the average of recent years.

Mr. WASON. I understand that, doctor, and I am not complaining.

Mr. TAYLOR. I am not defending either. I am just explaining that it is humanly impossible to estimate accurately on the details of it.

Mr. WASON. Consistent with your explanation, what answer—let me ask this question: Why did you expend practically $10,000 in 1921 under miscellaneous items and in 1922 estimate that your traveling expenses is going to be $5,000 over the expenditure in 1921, and this year $3,460 over your estimate for expenditures in 1922, as you differentiate the case on those three items, what is your basis?

Dr. TAYLOR. The expenditures of previous years. Of course, the fiscal year for 1921 we hope was the peak year of costs for materials and for labor, and for transportation and for all of those things. It was a year entirely outside of our previous experience in carrying on work of this character and we do not anticipate that the costs of 1921 will be experienced during the fiscal year 1923. If it should, this estimate would be entirely out of joint.

Mr. WASON. I do not get your explanation, because this year you estimate $87,935 as against $80,935 for 1921. If that is what you hope is your peak, why is it that you are asking for $87,935 for the current year?

Dr. TAYLOR. Because we wish to carry this, especially this pathological inspection service. This increase is asked for specifically for this feature of the work which we have not financed this year. It is a feature of the work, which, to the extent that it has been carried on at all has been financed by the Bureau of Markets.

Dr. BALL. May I interrupt to say there that this service has been carried in the Bureau of Markets and it is growing very rapidly. This is the place where it should be. Some of this service is paid for by the shipper, but this one is not.

Mr. WASON. But as I understand you have 16 pathologists. Is that one in the estimate paid for by the shipper or by——

Dr. TAYLOR (interposing). No.

Dr. **Ball**. But this place, of course, is not for that. This is only $7,000 additional asked for that work. On these estimates in here, you see we have this expense, and this is to cover the work done.

Mr. **Wason**. Then, there is no item explaining or covering it, except the doctor's statement.

Dr. **Ball**. It is included in this last statement.

Mr. **Wason**. Then, this is under another subject.

Dr. **Taylor**. The analysis of expenditures covers the whole paragraph including this increase in so far as the estimate for 1923 is concerned.

Mr. **Wason**. Then it includes two additional laboratorians at $900 and $1,440 and one laboratory aid, which you did not have in 1921, which is under this item in 1922, so that right there are the other objects of expenditures. I may be dull, but I do not get the doctor's answers.

Mr. **Anderson**. The difficulty, Doctor, seem that while your totals of salaries show one increase, your totals in numbers does not show any increase, and you have apparently put on two additional men.

Dr. **Taylor**. That is an apparent typographical error in the count here.

Mr. **Wason**. That is all.

Dr. **Taylor**. I think you are right there; that is, the number of employees shown here for the year 1923 is the same as the number for the year 1922, while actually the number for 1923 (if this increase is provided) should be two more in the class of pathologists. That should be 18 instead of 16.

Mr. **Buchanan**. Before we leave this subject, I want to see if I have the subject in my mind, Doctor. Here you have $87,935 asked for. What proportion of this amount could be devoted to the examinations of shipped fruit?

Dr. **Taylor**. Seven thousand dollars.

Mr. **Buchanan**. Only $7,000?

Dr. **Taylor**. Yes, sir.

Mr. **Anderson**. Now, if that is all, we will pass on to the next item.

Dr. **Taylor**. The point is that we have no funds for this at the present time.

Mr. **Buchanan**. That is, if it were allowed.

Dr. **Taylor**. In order that it may be understood let me drop back three years, and picture how this work began. It started under the stimulating agriculture appropriation of the war period, when there was a serious complaint of the loss of fruit in transit. It was found so useful and helpful to the Bureau of Markets and so helpful to the growers and the shippers of produce that we submitted an estimate for this same amount last year, if my memory serves me right.

The estimate was not granted. We were not able to finance the men. The Bureau of Markets regarded it of such importance that they did squeeze out enough to finance these two men and keep them in the field under our supervision, because it is work requiring pathologists. So that the Bureau of Plant Industry has not been paying these men.

That is possibly how this slip in this count of the specialists has occurred in this printed estimate.

Mr. **Buchanan**. All right. Now, then, $7,000 is the total of it, is it not?

Dr. **Taylor**. Yes; if this increase is granted, we could continue this work. If it is not, we shall have to stop it, as the Bureau of Markets has not a sufficient margin to carry it further.

Mr. **Buchanan**. Now, the balance of the $80,935, is that devoted to the investigation of diseases of fruits?

Dr. **Taylor**. Yes; entirely.

Mr. **Buchanan**. And is it necessary to continue?

Dr. **Taylor**. Yes, sir; the investigation of the diseases, the determination of their identity, their life history, the development of methods of control by spraying and by other methods and the putting of those methods into effect so far as we can through the extension services of the department and the States.

Mr. **Buchanan**. Now, this $7,000 will put about three men in the field and pay their expenses, and you are going to locate them at two or three places—New York and Chicago?

Dr. **Taylor**. They would be of the greatest value at those places, sir.

Mr. **Buchanan**. For the purpose of examining shipments of fruits at those places and other near-by places and making a report upon the conditions of those fruits and the cause of their deterioration.

Dr. **Taylor**. Yes, sir; primarily to identify and report the diseases causing serious deterioration.

Mr. **Buchanan**. One of the main causes of that would be the determination by the Government of whether or not the fruit raiser is responsible for the deterioration or whether or not there is any deterioration in existence that would affect the fruits.

Dr. **Ball**. Of course, the Bureau of Markets must have this information for the purpose of checking up these large numbers of shipments. The Bureau of Markets has a large number of men, but they are not scientific men. These men are called in to investigate the fruit which has been reported in bad condition, cases where the inspector who inspects these cars would not know what the trouble is, and, in fact, could not know.

Dr. **Taylor**. That works out like this, Mr. Buchanan——

Mr. **Buchanan** (interposing). These men will be used for the purpose of examining, as you say, the cars of fruit and ascertaining the cause of its bad condition.

Dr. **Ball**. Well, that will be a matter that will be under the Bureau of Markets.

Mr. **Buchanan**. These men you propose to employ will inspect only under and in cooperation with the Bureau of Markets?

Dr. **Taylor**. Yes; in cooperation.

Mr. **Buchanan**. Well, you have a number of inspectors in New York, have you not?

Dr. **Taylor**. The inspectors in the Bureau of Markets in New York will inspect, say, 200 carloads of fruit in a morning. Among those 200 there may be five carloads which present to them the appearance of diseases which are new to them and which they are unable to account for. They do not understand. They have not been up against it before, at least, in that form. The samples from those five cars are brought to the attention of the pathological specialist, who is there within reach, and he makes his examination and——

Mr. **Buchanan** (interposing). And gives his scientific opinion?

Dr. **Taylor.** And if he is unable, as is sometimes the case, to determine the exact identity and the nature of the disease, he forwards the material back to the laboratory here in Washington, so that there is a quick and thorough examination by experts. That will expedite matters so far as those diseases are concerned.

Mr. **Buchanan.** Now, what do the inspectors of the Bureau of Markets get—what salaries?

Dr. **Taylor.** I can not say with regard to that.

Mr. **Buchanan.** What salaries will these pathologists get?

Dr. **Taylor.** Why, $3,000, sir.

Mr. **Buchanan.** $3,000—these three?

Dr. **Taylor.** We need two men and their expenses.

Mr. **Buchanan.** Well, I will tell you, according to my belief you are carrying these men; the Agriculture Department has inspectors. They have men to determine and estimate the damages, and things of that kind. Why could you not have men also qualified to pass upon the scientific view of it?

Mr. **Anderson.** It would cost more money that way.

Dr. **Taylor.** Yes; it would. It would be highly desirable, but it will be 25 years before we could get enough qualified men.

Mr. **Buchanan.** Why would you have to wait 25 years?

Dr. **Taylor.** Because we can not get the men.

Mr. **Buchanan.** Well, you are asking for three here.

Dr. **Taylor.** We ask for two specialists who can act as expert pathological advisers to the entire force of inspectors.

Mr. **Buchanan.** You would not have in the whole groups, I suppose, men who are expert, as these inspectors are, and they are not in the same class as these men, these other inspectors.

Mr. **Anderson.** Now, then, if you were to employ these experts as inspectors for all of these places, of which you have a very large number, it would be at a very much greater cost to the Government, and it is perhaps impossible to do.

Dr. **Taylor.** Yes; and it could not be done inside of several years.

Mr. **Buchanan.** Well, I am not so sure about that; but we will pass that up now.

These men, you say, are to go to New York and Chicago and the Bureau of Markets has several inspectors in those cities. Is there any reason why among the number you could not have a man qualified for this sort of work?

Dr. **Ball.** Mr. Buchanan, may I answer that question? The reason for having these men is that any scientific questions that will come up will be referred to that man by the Bureau of Markets. Otherwise they would have to establish in their bureau a pathological division to take care of that subject.

Mr. **Anderson.** And the effect of that will be to build up in the Bureau of Markets a little pathological bureau right in the Bureau of Markets.

Now, the bureau got started on that proposition at one time and I think that they went further in that direction than was desirable, and I think that you will save money by keeping the pathologists and the other scientists away from the Bureau of Markets, and that you will be ahead from the service end.

Dr. **Taylor.** I want to say that after considerable experience and very earnest consideration, including a very full interchange of views and opinions upon this, the general policy is in effect with respect to these matters that the Bureau of Markets undertakes to maintain its force of men, inspectors in the various fields, who are qualified to handle all questions of ordinary conditions and degrees of greenness and ripeness and so on, with respect to these things, but the Bureau of Markets does not attempt to maintain pathological laboratories or to employ pathologists, or to duplicate anything which is already under way in the scientific bureaus.

Mr. **Magee.** Can you give us approximately the number of inspectors engaged in this work under the Bureau of Markets?

Dr. **Taylor.** I can not tell you that, Mr. Magee. They are scattered and they have a considerable number in different cities.

Mr. **Magee.** Can you not give us any ideas, then?

Dr. **Taylor.** I can not even guess as to the number, although provision for them is in the estimates of the Bureau of Markets and could be located.

Mr. **Magee.** I was trying to find out how many, if you could give us an idea, there were engaged on this important phase of this work.

Dr. **Ball.** There are 57 inspectors, at $1,620 to $3,500 a year; 57 inspectors.

Mr. **Buchanan.** This is not my idea at all, because you have these traveling inspectors and stationary inspectors inspecting shipments of fruit, and I see no reason why we should maintain pathologists for those places, to make a personal inspection of the same fruit, at the same places. I think that there could be there maybe one among the entire number who could be a pathologist and determine the trouble from a sample that was sent him. He could not tell anything by looking at the fruit.

Mr. **Magee.** They would have to get on the ground very quickly, would they not?

Dr. **Taylor.** Yes. It is very important. It can fairly be compared with the present practice of the medical profession. When I call my doctor, he examines me, and if he finds that there is something that looks suspicious to him which he is not sure about, he will take a specimen, and takes it to the specialist who can determine positively what the trouble is. The physician bases his treatment and practice upon that exact determination made by the specialist.

Mr. **Buchanan.** Well, let us go on with the next one.

INVESTIGATION OF DISEASES OF CITRUS TREES—ERADICATION OF CITRUS CANKER.

Mr. **Anderson.** If there is nothing further, we will take up the next item on page 45, "For conducting such investigations of the nature and means of communication of the disease of citrus trees, known as citrus canker," etc.

Dr. **Taylor.** The paragraph on page 45 is what is known as our citrus canker eradication, a paragraph in which we recommend a decrease of the appropriation from $79,720, as carried this year, to

$30,000 for next year. As this is handled by Dr. Kellerman, I will ask him to discuss it.

Mr. ANDERSON. All right, Dr. Kellerman.

Dr. KELLERMAN. Mr. Chairman, I think that a very brief statement is all that is called for with regard to this item. The work has gone forward very satisfactorily, and we are steadily decreasing the number of inspectors.

We have had no citrus canker in Florida for considerably over a year, and during the preceding 18 months there was only one single case, and that was the result of overlooking a small grove at an isolated point in the piney woods.

Our work at the present time is just scouting through the citrus country generally. I think all of the commercial areas are free from canker. There are still a few small door-yard plantings that we may not have discovered, and those are the ones we are searching for. We hope to find all of those diseased trees that might spread the disease and be a menace to the commercial territory.

We hoped that we would be able to turn back some of the $79,000 appropriated for the present year, but the discovery of an isolated case of canker in Mississippi and one in Alabama has broken what we hoped to make a record for all of the Gulf States. This year there was a single case, a single tree only, in fact, in Mississippi, which was found to be infected. We have not yet traced the cause of that infection, but it has necessitated a little greater expense than we had counted on.

The same thing has happened in Alabama, where we found an abandoned nursery, where the old trees, practically wild trees, in the nursery rows had become infected. One grove tree in that region had become infected. Those have been cleaned out, and we hope that there will be no further recurrence of canker in that district, but those two cases mean that we will have to continue close inspection in both States for several months yet.

The scattering cases in Louisiana have been, I believe, largely traced, and in the commercial zones all of them eradicated. We hope to be able to complete the back country inspection in another year.

Mr. ANDERSON. And there still exists some necessity for inspections?

Dr. KELLERMAN. Yes, sir; there still exists necessity for inspection throughout the Gulf region.

We are certain that canker is not entirely eradicated from Texas and Louisiana, but we feel reasonably sure now of Florida, and we are very hopeful for both Mississippi and Alabama, although it is possible that we may find that there are a few scattering cases in those States.

Mr. ANDERSON. Are the States still maintaining some inspection force?

Dr. KELLERMAN. Oh, yes; the States are still maintaining cooperative action. In fact, Mississippi is maintaining her inspections practically independent of the Government now, and also Florida.

Louisiana will probably maintain practically independent inspection next year, as we expect to decrease our funds.

Mr. ANDERSON. Is the citrus industry of Louisiana of considerable proportions?

Dr. **Kellerman**. It is not an extensive industry. The commercial industry is largely below New Orleans in Plaquemines Parish, and that is clean.

That, by the way, is being maintained under a very strict quarantine which is financed and managed entirely by the orange growers themselves, with only supervision from the combined State and Federal employees.

We think that in spite of the fact that some scattered cases of canker have been found this year, we feel that we can maintain a sufficient number of inspectors with the $30,000 we are asking to have continued, and we figure that if all goes well next year this fund can be still further reduced.

Mr. **Anderson**. Are there any further questions along the line of this item?

Mr. **Buchanan**. Yes, sir. Now, takes these States. They have been cooperating?

Dr. **Kellerman**. Yes, sir.

Mr. **Buchanan**. You have been doing this work for five years?

Dr. **Kellerman**. Yes, sir.

Mr. **Buchanan**. Your remedies for this canker is well understood by the State officials that are cooperating with you?

Dr. **Kellerman**. Yes, sir.

Mr. **Buchanan**. Is there any reason why, when there are only a few isolated cases or places like these in Louisiana and Texas, that these States can not take the work over now? Now, this affects my State, you understand, but we would like to reduce the appropriations as much as possible and not make any unnecessary appropriations or any appropriations beyond actual necessities. I can see no reason why the State authorities, with the local authorities, in the face of all that has been done, can not take this work over now.

Dr. **Kellerman**. There are many reasons, but they can be grouped under the necessity for cooperation.

Mr. **Buchanan**. Well, they all have entomologists, do they not, doctor?

Dr. **Kellerman**. This is primarily a problem of very careful field inspection. I think in every State, that all of the States are carrying about all that they can handle, with their existing funds. If this work is not supported at all on the part of the Government, a material decrease in the quality of the inspections must take place.

Now, that is really the whole point. We are planning to decrease our inspection in cooperation with the States just as rapidly as we think that it is safe.

We do not feel that it would be wise to stop right now when we know that there is some canker in two States; when we know that canker has been found recently in two other States; when we know that the chances of scattering canker by distributing infected nursery stock into the territory that is clean still exists.

We do not feel that it is safe to completely abandon the inspection work on the part of the Federal Government. We have found that we are in position, in the Federal Government, to bring about a degree of cooperation that is distinctly out of proportion to the amount of money we put in.

The States will work with us more freely than they will work with each other. The community of interest with the Federal Government in is more harmonious. That is one very urgent reason why we ought to continue this work until we have gotten rid of the last trace of canker.

Mr. **Buchanan**. Of course, that last reason goes with everything.

Dr. **Kellerman**. But you must, of course, remember this, Mr. Buchanan, that the greatest part of this work has been done. We have cut our funds at least as fast as we ever predicted that we might be able to, and we are cutting them in considerable amounts.

We are predicting that we will be able to eliminate this appropriation and this activity completely, although we are still not able to say exactly when we can do it.

I think the showing we have made justifies our position in saying that we have only asked for the money that we really needed and that we are expending the funds wisely.

Mr. **Magee**. Well, I notice that the appropriation for 1918, Doctor, was $430,000?

Dr. **Kellerman**. Yes, sir.

Mr. **Magee**. Now, I would like to know for my own information, if the Government ceased the work now what, in your judgment, would be the danger from this disease?

Dr. **Kellerman**. Well, I might say that there is no doubt but that it would be the biggest mistake that could be made. In spite of the fact that this appropriation is a comparatively small one, we do feel that it is essential. Without this aid there would be a recurrence of the canker epidemic, and I doubt whether we could again reach the stage that we have reached now.

Mr. **Magee**. The fact of the matter is that it might mean if this appropriation were greatly reduced that the disease might spread over an area that is now free from it, and that if the Government should cease now that it would mean that there would be a new outbreak which would ultimately result in increased appropriations by the Government to get such control of it as you have now.

Dr. **Kellerman**. I feel, sir, that that is exactly what would take place. I feel sure that without this small appropriation the disease would spread rapidly and that larger appropriations would be necessary to handle it, and that if larger appropriations were not made in the early stages of the new epidemic that it might become uncontrollable.

Mr. **Anderson**. If there should be another outbreak this appropriation would look like a nickle in the Federal reserve vaults.

Dr. **Kellerman**. It certainly would. It would be a crime, according to my opinion, at this time to let anything interfere with our permanent success.

Mr. **Magee**. I wanted to be satisfied on that.

Dr. **Kellermman**. The other trouble with this is that this is a disease that now is only in territories where the citrus industry is of no value commercially. With the people of Florida, why, they know how important it is and they are supporting it, every individual, because it means a living to them; but when you get to the door-yard regions they do not know anything at all about it and they are not interested in it and will not even discuss it with you.

Mr. **Magee**. Has there been any canker found in California?

Dr. **Kellerman**. No; it has not got into California. The farthest est that the canker has been found is Laredo, Tex.

Dr. **Taylor.** You will remember that until the disease caused damage in this country it had not been distinguished from the ordinary citrus scab, which, while troublesome, is not a destructive disease. It was brought into this country by some Japanese nursery stock coming in through British Columbia to Texas, to a Japanese nursery near Galveston. There the disease was regarded as citrus scab when it spread to the young trees in the nursery. A shipment from there got across into northern Florida and from northern Florida a shipment got down into the grapefruit territory in southern Florida, where there is no dormant season for the trees, where it is summer all the year, and it was there that it began to spread like wildfire and destroy the groves that had a value of from a thousand to two thousand dollars per acre.

With reference to the canker eradication, it is the first time, so far as we know, that there has been an actual eradication from an entire country of a bacterial disease of plants; the first time that has appeared possible. It does now appear possible. It is cornered. It is necessary, however, to keep it cornered and get it out while we have got it under control.

Mr. **Buchanan.** With this statement, of course, I realize that the Government has done exceedingly wonderful work, and I am not criticizing that on the part of the Government; but my idea is that the method of control is fairly understood and developed and that the treatment has been proceeding along with the Federal Government cooperating with the States.

The disease is now practically under control, and there are only a few instances in two States where the disease exists. It seems to me that the States ought to be able to take care of it now; but, of course, if the Federal Government so trains every State in the Union to rely upon it and to expect it to take care of them and to look after their domestic concerns, then we will have to go ahead and take care of them.

Dr. **Kellerman.** If we can clean it out, as was done with the foot-and-mouth disease in the case of live stock, which was cleaned out, the whole country will be on a safe basis.

Mr. **Anderson.** We spent four or five million dollars on the foot-and-mouth disease.

Dr. **Kellerman.** I think more than that, considerably more than that, in the two or three times that it has got in.

Mr. **Anderson.** Well, it was cheap at any price, and I think that it was the best work that we have ever done.

FOR INVESTIGATION OF DISEASES OF FOREST AND ORNAMENTAL TREES AND SHRUBS.

If there is nothing further on this item we will take up the item on page 48, "For applying such methods of eradication or control of the white-pine blister rust as in the judgment of the Secretary of Agriculture may be necessary."

Mr. **Buchanan.** There is an item on page 47.

Dr. **Taylor.** We have an item, Mr. Chairman, on page 47, under which we investigate diseases of forest and ornamental trees and shrubs. Our estimate is for the same amount that we have this year, which was the same amount as last year and somewhat lower than the preceding three years.

Mr. ANDERSON. Is there anything new in this work?

Dr. TAYLOR. There are under way a number of investigations of diseases of forest trees in various parts of the country; diseases that are causing trouble through the premature destruction or impairment of the value of commercial timber trees.

Also, we have diseases of shade and ornamental trees, which, in the case of street, park, and dooryard trees, cause trouble. The research on diseases of forest trees in the Bureau of Plant Industry is done in close cooperation with the Forest Service, avoiding any overlapping or duplication.

The Forest Service is carrying on the forestry work and the Bureau of Plant Industry is carrying on the forestry tree-disease work, so that they employ no pathologists, and we employ no foresters. Our men are headquartered with the Forest Service at such points as San Francisco or Albuquerque, or wherever that work in the field is being done.

Mr. ANDERSON. Does this work have any relation to the tree-surgery work which is being carried on so extensively now?

Dr. TAYLOR. We have a man who is specializing on the repair and care of trees—street and park and home-place trees. This is an important field which is not fully occupied nor yet standardized in its practices.

I may say incidentally that certain methods of repair, the use of which have been protected to the public through public-service patents developed by our men, are rapidly displacing the generally prevailing methods of concrete filling, the concrete having proved too unyielding to stand without fracturing itself or doing harm to the tree when the tree sways with the wind. These methods are based simply on the practice of sterilization of the decayed surface, after it has been scraped and cleaned as thoroughly as possible by covering it with an asceptic material and then filling with a flexible compound composed sometimes of treated sawdust with enough bitumen and other flexible matter to make a really flexible filling. This gives under pressure and will not, through its hardness, cut the tissues of the tree, as in the case of concrete. Distinct progress is being made there.

FOR ERADICATION AND CONTROL OF WHITE PINE BLISTER.

Mr. ANDERSON. The next item is on page 48, for white pine blister rust eradication work. I think you have found very recent infestations west of Minnesota?

Dr. TAYLOR. Yes, sir; unfortunately, that is true. That, however, has occurred since this estimate was prepared, and there is no reference to it in these estimates. I will say, first, that this estimate proposes a continuance of the work now under way, which includes the scouting and inspection to determine the areas of white pine that have become infected with the disease, the further development of control methods, especially methods to reduce the cost of control work, and the maintenance of inspection service to prevent the movement of either currant or gooseberry bushes or of young seedling pine trees which may carry the disease through parcel post or other movement to the great pine areas of the West, where the largest body of our susceptible pines is located.

Mr. Anderson. Does this affect other than white pine?

Dr. Taylor. It affects the eastern white pine, and so far as known all 5-leafed pine, including sugar pine and several other important timber species of the West. They differ somewhat in quality of timber, but commercially they have as white pine of one district or another. Idaho white pine——

Mr. Anderson (interposing). Idaho has about all that is left out there of white pine.

Dr. Taylor. There is some in Oregon, some in Washington, and some in California; the heavy commercial cuts are at present in Idaho.

Mr. Magee. There is white pine in New York.

Dr. Taylor. Yes; that is the old original or true white pine, and the best one when quality of timber is considered. This estimate, as I say, proposes continuation of this work on its present scale. Since this estimate was formulated there were discovered in September in the vicinity of Puget Sound in British Columbia, and in November in the State of Washington in the Puget Sound end of the State, some infections of this disease. The discoveries were made only shortly before winter set in, so that we have not been able to get full information of the area of infection in British Columbia, although there is reason to expect that the area there is rather extensive. The recorded infections in the State of Washington are in restricted localities and fortunately in territory where there is only a scattered and rather unimportant stand of the susceptible pines, so that there appears to be a fair prospect at this date of clearing out the disease from the State of Washington. That is as far as we can say now.

Mr. Anderson. I did not get whether you said there was any in Oregon or not.

Dr. Taylor. No, sir; four points in the State of Washington, all near Puget Sound, are the only ones so far located. When these infections were discovered the lumber and land and timber interests of the Pacific Northwest, especially the States of Montana, Idaho, Washington, Oregon, and California, called a meeting which was held at Portland, Oreg., in December to consider the situation and determine what could be done. As a result of their consideration of the matter and their representations to the department, confirmed by the observations of our own pathologists, who made as thorough an inspection as was possible within the limited time, a deficiency estimate has been submitted to the Director of the Budget and approved by him to provide means to endeavor to clear out that infection. Effective work would necessitate funds available early in the spring, so that work in the field could start with the growing season.

Mr. Anderson. To what extent does that estimate contemplate that the Federal Government shall participate in the work?

Dr. Taylor. That estimate contemplates an initial expense by the Federal Government of $150,000, against which there are no State appropriations available specifically for use with this disease.

None of their legislatures meet before January, 1923, as I understand it. There are, however, in the forestry and agricultural departments of the several States concerned, a large number of men whose services can be devoted to scouting and control work a portion of the time. The value of such services offered has been placed by the State officials at between $70,000 and $80,000. There is also available in the form of labor and other necessary service tendered by the fire-fighting associations, the lumbermen's associations, and the other commercial organizations cooperating amounting to possibly $100,000 for the current year.

Mr. MAGEE. What do you mean by a deficiency estimate? Has an estimate been submitted?

Dr. TAYLOR. The estimate has been submitted to and, as I understand it, approved by the Director of the Budget.

Mr. MAGEE. Are there any pending deficiency billls? The chairman suggests that you might mean a supplemental estimate.

Dr. TAYLOR. No, sir; this was submitted as a deficiency estimate in the hope that the necessary appropriation may be available early in the spring, when the work should begin.

Mr. MAGEE. Is not the last deficiency bill the one that passed the Senate?

Dr. BALL. They recently issued a call to send in our items for a deficiency bill.

Mr. ANDERSON. You are going to eradicate infestations out in Washington?

Dr. BALL. Yes. We are going to start in on that basis, because it is the only constructive basis that we can start in on. If it is not in Washington State outside of these four infected localities there is a fair prospect of eradication. If there should be found serious infections in thickly forested areas it would not be possible to clean them out.

Mr. ANDERSON. In this clean-out work do you contemplate that the Government shall go in and do actual physical work of eradicating currant and gooseberry bushes and cleaning out the area?

Dr. TAYLOR. The bulk of this will be scouting and inspection and locating the areas. Labor for cleaning out will be provided by the State agricultural and forestry departments, fire-fighting associations, and the lumbermen's associations, so that the actual work of eradication, except in the event that we should find infection on the forest reserves or in the national parks, would be at the local expense. The stumpage value of the pine that is jeopardized is somewhere in the neighborhood of $250,000,000 at present stumpage figures, and of that approximately one-third is owned by the Government in the national forests and the national parks.

Mr. BUCHANAN. In this appropriation here I notice that in the discretion of the Secretary of Agriculture no expenditures shall be made for these purposes until a sum or sums at least equal to such expenditures shall have been appropriated, subscribed, or contributed by States, county or local authorities, municipalities, or private individuals or associations.

Has he made any such requirement or exercised discretion in this matter?

Dr. TAYLOR. Yes, sir.

Mr. **Buchanan**. In this specific appropriation?

Dr. **Taylor**. In general, under this appropriation this policy has been followed, and if you will forget for a moment this western outbreak, which has nothing to do with this present estimate——

Mr. **Buchanan** (interposing). Certainly not. I am not talking about that.

ORIGIN OF DISEASE.

Dr. **Taylor**. The disease got in the New England States and New York on nursery stock imported from European countries, particularly from Germany, mostly some 12 years ago.

Mr. **Buchanan**. This appropriation is not for nursery stock?

Dr. **Taylor**. No; but if you will pardon just a moment, I would like to picture the situation briefly so that it will be clear. The disease was not known to be in the country until the young pine trees which were infected when they came across the ocean developed the characteristic symptoms and began throwing off spores that passed the fungus indirectly to other pine trees by way of currant and gooseberry bushes. The disease can not pass direct from pine tree to pine tree. That is thoroughly established and beyond any shadow of doubt. The spores from the diseased pine scatter to the leaves of the growing currant and gooseberry bushes, either cultivated or wild, and the disease spreads from those leaves either to other pine trees or to other gooseberry or currant bushes. We use the word "ribes" for these, because that is a shorter expression than "currants and gooseberries." From the ribes leaves the spores drift back to the pine trees, whether they are small seedlings which are just coming up or whether they are trees 100 feet high. The control of the disease, where it is not possible to eradicate it, comes through the clearing out of the currant and gooseberry bushes from the area of the pine woods and a zone of approximately 900 feet around the outermost edge of the pine forest that is to be protected.

Mr. **Buchanan**. Out from the infected portion of it?

Dr. **Taylor**. Yes. That zone must be free of ribes to protect the pines within it from infection or from reinfection in case they have had it before.

DAMAGE TO TREES.

Mr. **Anderson**. How does this blister work on the tree?

Dr. **Taylor**. It has been proved within the last year that it enters frequently through the individual pine needles. The spore lodges on that slender pine needle, possibly when there is dew there. It germinates and punctures the tissue of the needle and grows back to the twig, then it proceeds to grow through the inner bark of the twig, the cambium layer, and to gradually girdle the twig and work back toward the main branch, and ultimately to the main trunk of the tree. Now, the question of the extent and rapidity of the damage depends a great deal upon the age of the tree. In New Hampshire, Vermont, New York, and Maine, last September, we found areas of young white pine reproduction where timber had been cut during the past few years, and the young seedlings were literally burned up by blister rust infection during the last three or four years. Alongside of this there were old pine trees upon which would be branches showing what they call the "red flag" of the blister rust. When a branch is girdled and the sap flow is cut off by the fungus, the foliage reddens, so that there is a distinct red limb up there. Trees that are now 30 years old and but just infected probably will not be killed before they are ready to harvest at the age of 40 to 50 years, as is the practice in the Northeastern States. White pine is an important crop in these States on land that formerly was in cultivation, and it is in extensive areas the most important cash crop that the farmer has, although it takes about 50 years to grow it up to the point of profitable cutting.

Mr. **Lee.** What size does it grow in 50 years?

Dr. **Taylor.** From 12 to 18 or in some cases 24 inches in diameter in 50 or 60 years.

Mr. **Wason.** You haven't got it large enough quite.

Mr. **Anderson.** In New Hampshire.

Mr. **Wason.** I know what I am talking about, because my brother and I have sold over 2,000,000 feet in 10 years.

Mr. **Lee.** You have seen two or three crops grow?

Mr. **Wason.** No.

Mr. **Buchanan.** My question was whether or not the Secretary of Agriculture had exercised discretion under this law.

Dr. **Taylor.** With this background, let me say this, that in the areas east of the Great Lakes, where the infection is now known to be fairly general on the currants and gooseberries, and, therefore, spreading back gradually to the pine trees, it has been the practice to require each State, with rare exceptions, to meet local temporary conditions, dollar for dollar expenditures by the States. These local funds are in part State appropriations, in part they are appropriations by towns, in part they are contributions by the local landowners, or in some cases, where there are rather extensive holdings, the owner of the holding finances entirely the operation on his place, excepting the expert supervision which is necessary to do a thorough job of clearing out these ribes bushes.

Mr. **Buchanan.** That answers it.

Dr. **Taylor.** I wish to make clear that in the West, where the disease has not been present until now, and where the Government's holdings of pine are important, no contribution by the States has been required.

Mr. **Wason.** I notice that you state that they cleared the area 900 feet adjacent to the infected growth.

Dr. **Taylor.** To the groves which it is desired to protect; yes, sir; a 900-foot zone outside of the actual forested area.

Mr. **Wason.** Haven't you got your distances a little short?

Dr. **Taylor.** That distance is in excess of the longest spread that is known from ribes back to pine under average forest conditions. In the other direction—that is, from pine to ribes—the spread is very much greater, because you have the high start under the influence of strong winds, and so the spread of the disease from the pine tree that is infected to currants and gooseberries is much farther than the 900 feet. In some cases it probably may be as much as 30 miles. There are cases where that appears to be true, although it has not been scientifically established yet. But the control phase is as well established through several years of observation and very careful scrutiny of the vicinities of the introduced infections.

Mr. **Wason.** I am glad to hear you say 900 feet, because that has been a matter of dispute between me and experts.

Dr. **Taylor.** There was a time when 600 feet was considered safe, but they have found infections of pine in the neighborhood of 800 feet from the nearest ribes.

Mr. **Wason.** Then if I insist in an argument that one-half a mile is more than ample, I can get the opinion from you that will substantiate that?

Dr. **Taylor.** Yes, sir; a half mile would be ample and beyond any observation or recorded spread from ribes to pine, except occasionally from large plantings of cultivated black currants.

DEFICIENCY ESTIMATE.

Mr. **Anderson.** I understand that a supplemental estimate is coming up in this item for $75,000. I wondered if you care to discuss that while we are on this item?

Dr. **Taylor.** You may recall that this item carried $214,000 until a year ago, when it was reduced to $100,000. The $114,000 which was cut off was used in the manner that I have described on the dollar-for-dollar basis in the eastern white-pine territory. Under the present reduced appropriation it became impossible to carry that feature of the work along. Under the present plan the work is expected to be exclusively on the basis of scouting and along educational lines, including extension agencies, in an effort to encourage prompt and efficient clearing out of ribes in those areas that are infected. The northeastern lumbering and manufacturing, timber, and agricultural interests feel so keenly that a critical time is here and that the fate of eastern white-pine production for the next century will be determined in the next 5 or 10 years that, after these estimates were submitted and had been passed by the Bureau of the Budget, the Secretary submitted supplemental estimates providing $75,000 for work on the dollar-for-dollar basis in the territory from Minnesota eastward, chiefly from Lake Michigan eastward, for stimulating and maintaining punch in this ribes-eradication work.

Mr. **Anderson.** I take it, that will be largely spent in furnishing the know how and the organiation and that sort of thing.

Dr. **Taylor.** And in part in maintaining an expert supervision of the clean-out forces which is required to make sure that the work is thoroughly done. The first several weeks that even a bright, keen woodsman spends in this work is simply schooling for him to give him the sort of scent for currant and gooseberry bushes that a hunter gets for squirrel and for quail. It is possible to develop that sense of location and that thoroughness of clean out which is essential to protect the timber. It is astonishing how some of these fellows who have been on the work for two or three years are able to go almost unerringly to a single currant or gooseberry bush that has been missed by a crew that is working within hand-to-hand touch of each other as they carry a swath through a piece of woodland where there are scattered bushes of wild ribes. The keystone of the arch of ribes eradication is the thoroughness of inspection of the work that is done and the training and maintenance of qualified foremen for the gangs that do the work. The workmen themselves are typical farmers and farmers' sons of the neighborhoods. Unquestionably much can be done now that our men know how to do it and can dogmatize with respect to what is required and then place key men at important places and keep the work going.

The areas that will be advisable to undertake to clean up and the order in which it will be advisable to attempt to clean up will depend very largely upon local sentiment in a town or in a county. Where the owners of the land, or a majority of them, are alive to the importance of it and know that their white pine is likely to be their most important money-earning crop, it should not be difficult to organize and clear these ribes bushes out. In sections where pine is less important and where field crops are relatively more important it will be more difficult. The fortunate thing, of course, is that if you clear the 900-foot zone around the town that is awake and knows that it is worth while, or around the county or around some area that is worth while inside of the county, you have got substantially the protection that is required. I may say that as a result of a very thorough and, I think, effective consideration of the whole matter with the extension of forces of the States involved and the forestry departments of those States and the leaders of local opinion in the rural territory a plan has been developed and proposed in the supplemental estimate for the organization and maintenance of a blister-rust agent in each county where the pine is important and the sentiment is willing to meet the Federal expenditure. It is believed that from three to five years of persistent work will be required to clear up any such unit as a county, that depending considerably upon the abundance of the currant and gooseberry bushes in the timberland areas.

Mr. ANDERSON. We will take up the item on page 49, for the investigation of diseases of cotton, potatoes, truck crops, forage crops, drug and related plants.

WHITE PINE BLISTER RUST IN BRITISH COLUMBIA.

Mr. WASON. What is the situation relative to the infection of white pine blister rust in British Columbia which you have referred to, and what is the British or Canadian Government doing toward eradication of it there which may be up to our infection south of the border line, if you know?

Dr. TAYLOR. So far as we know there is a considerable area infected in British Columbia apparently tracing to introductions through importations of small pine trees for planting several years ago. There has been some spread from these to the cultivated ribes in the vicinity of the city of Vancouver and several other localities in the Puget Sound end of British Columbia. The British Columbia government was represented in the conference at Portland the middle of December, and while, of course, not in position to say what the Canadian Government will do, their representatives indicated the intention of the British Columbia pathological inspection force to go to the extreme limit of their present financial resources and put the matter up to the Canadian Parliament for action. We can not say with assurance that British Columbia will ever be cleaned up, for the area of infection there is known to be much larger than the area on our side of the line, but in so far as any one can speak for British

Columbia they have expressed their intention to do their best and to seek the support of their government on it.

Mr. Anderson. Is there anything being done with the infections in Minnesota?

Dr. Taylor. Not at the present time except to establish and maintain certain demonstration areas where blocks of young pine are coming along for the future which would be destroyed by the disease if they were left for the disease to take its course. Those are being treated as demonstration areas in the expectation that after the lumbering phase, now well along there, which every pine region seems to have to go through, is passed and reproduction of forest growth for commercial supplies of the future comes, there will be visible standing proof that public sentiment can be crystallized about such work as now is under way in New England and New York. That same thing is true in the State of Wisconsin. There is a break in the area of infection comprising the whole State of Michigan. There is no infection between Lake Huron and Lake Michigan and there in Michigan there is an opportunity now for a clean start in white pine reforestation.

FOR INVESTIGATION OF DISEASES OF COTTON, POTATOES, ETC.

DISEASES AFFECTING TOMATOES.

Mr. Anderson. Take up the next item on page 49, investigation of diseases of cotton, potatoes, truck crops, forage crops, drug and related plants. You are asking for an increase of $17,000.

Dr. Taylor. This paragraph is the one under which we prosecute the investigations of the diseases of these important crops, and the appropriation for the current year is $100,000. The estimate for next year is $117,000. This increase of $17,000 is desired to devote to three special purposes, the first is an item of $7,200 for investigation of diseases affecting the tomato. This applies especially to the tomatoes grown for canning, the production of which is an important agricultural item in States like New Jersey, New York, Delaware, Maryland, Ohio Indiana, Illinois, and Iowa where the canners contract with the farmers to grow definite acreages at definite prices per ton. For the last few years there has been, especially in what is known as the tri-State canning territory, which means New Jersey, Delaware, Maryland, and a part of Virginia, a very serious drop in yields per acre due to certain diseases that are not yet well understood nor under control.

Mr. Anderson. Has this drop been a continuous one from year to year or periodic?

Dr. Taylor. The most acute phases of it have been during the years of 1921 and 1922. The average yields per acre under high culture and fertilizing practice showed a drop during those two years of something like one-third below what had previously been considered the normal tonnage per acre, taking the whole plantings into account and the project is one which needs intensive attack.

Mr. Lee. Do they use much fertilizer in those territories?

Dr. Taylor. Yes, sir; practically always in New Jersey and Delaware.

Mr. Lee. I think that is perhaps one of the reasons. In the South the fertilizer is so high they can not buy it, and wherever they fail to use fertilizer the crops are short.

Dr. Taylor. The tomato growers know very well that they can not expect yields without their normal fertilizing, so that they have maintained their fertilizing better than has been the case with cotton and some of the other crops farther South.

Mr. Lee. I thought that was one reason.

BEAN DISEASES.

Dr. Taylor. There may be places where that enters into it. The second item desired is $5,000, for enlarging present investigations in bean diseases. This relates primarily to what is known as shell-bean production, which is heaviest in States like New York, Michigan, and California.

Mr. Anderson. Is that what is called the navy bean?

Dr. Taylor. The navy bean in particular; yes. This work involves breeding of disease-resistant varieties, resistant to anthracnose and some other bean diseases. It will be necessary to establish cooperatively with one or another of these bean States what we call a temporary field station and secure a farm upon which the breeding and increase work can be done under controlled farm conditions. There is close cooperation in this work with the experiment stations in New York and Michigan, and all the forces that have bearing on it are being concentrated into the cooperation.

Mr. Anderson. I have an impression that two or three years ago there was quite an acute situation in this bean territory, and at that time an increased appropriation was made for this bean work. Am I in error?

Mr. Taylor. I think there was a slight increase, a couple of thousand dollars for that work, and out of that came what is one of the most encouraging features with respect to anthracnose resistance in the navy-bean fight, the development of a variety known as the Robust, which is a pea bean which is now being increased very rapidly by the Michigan State Farm Bureau seed department under contracts with farmers, so that where that disease is the limiting factor there is a pretty good prospect of practical control. The resistant variety must be so resistant that the seed crop is not affected as the disease spreads through the seed and there is no way of disinfecting the seed that is infected.

DISEASES CAUSING LOSSES DURING STORAGE AND MARKETING.

The third item, $4,800, is similar in character though different in the type of crops that are handled to the $7,000 item for pathological inspection of fruits arriving at market.

This $4,800 is desired for carrying forward the work of vegetables reaching those market centers. They reach those places throughout the whole year fresh from the fields, and from an even wider range of territory than the fruits do, the lettuce and onion shipments of Texas and southern California. The whole range of out-of-season vegetables from Florida—tomatoes and egg plant, early potatoes, string beans, and peas and lettuce and celery—as well as the normal summer production of Northern and Western States. It is a line which we are satisfied is important, and we feel that many times the expenditure involved can be saved to the producers and shippers through quick determination of what the troubles are and quick reflection back to the producing territory of remedies for them.

Mr. ANDERSON. It is something in the nature of the work that the Bureau of Animal Industry does with the stockyards?

Dr. TAYLOR. Yes; that is a fair comparison.

Mr. ANDERSON. You get an indication of the sources or centers of the disease, which it would cost a great deal more to discover if you had to run around after it?

Dr. TAYLOR. Yes, sir; or if we had to wait until the information drifted into the department through correspondence.

Mr. BUCHANAN. Who has charge of the boll-weevil work?

Dr. TAYLOR. The boll-weevil control work is by the Bureau of Entomology, under Dr. L. O. Howard.

Mr. BUCHANAN. That does not come under this?

Dr. TAYLOR. No, sir; all insect work is under the Bureau of Entomology.

FOR INVESTIGATING THE PHYSIOLOGY OF CROP PLANTS, ETC.

DATE PRODUCTION.

On page 50, the paragraph for investigating physiology of crop plants, for testing and breeding varieties thereof, we ask no increase. If it is the desire of the committee to discuss that, I shall be gald to do so.

Mr. ANDERSON. Just one question on this item. As I recall, we increased this item by $10,000 last year for some work in connection with date production.

Dr. TAYLOR. Yes, sir.

Mr. ANDERSON. I would like for you to give us some idea of what was done. I have been very much interested in that date work and wish to keep track of it.

Dr. TAYLOR. The date work is a project in which our endeavor is to transplant from the desert commercial date-producing areas of the world, the Sahara, Egypt, and portions of the Persian Gulf territory, an industry which differs from all other commercial fruit industries in this fact, that there is no method yet discovered of propagating the date by means of budding or grafting; therefore, you can only multiply the desired variety to the extent that offshoots at the base of the trunk appear and can be removed and placed in special beds for rooting. You are almost as definitely limited in your multiplication of any particular variety of date as you would be in the offspring of a particular cow if the cow was in fact only producing during the first 20 per cent of her age. The date palm after being established as a rooted offshoot grows vegetatively and even before it begins to bear fruit it begins to throw off shoots, some varieties only one in a year and some more than that, but the choice varieties, in general, not yielding a total of more than about from 15 to 30 offshoots during the offshoot producing portion of the life of that tree.

After a tree once stops producing offshoots in natural course there is no known method of compelling it to produce more, and consequently if you get a choice seedling date that will be comparable with a choice seedling apple or peach, if you do not get your multiplication of it started during that first 15 to 20 years of its life it is gone and there is no way of reproducing it, and, also, if you start with a variety that is unadapted to the conditions, if you plant your expensive irrigated land with a variety which does not fit those conditions, which either is unproductive or does not mature within the growing season that you have there or is sensitive to fogs that may occur during the period of two or three weeks at the ripening time there is no way that you can graft over to an adapted variety as you can all other fruit trees that we know anything about. Now, that means that if hazard and waste are to be held down somewhere near the minimum in the development of the industry we must get as early in the development of the industry as possible an adequate stock of the choice varieties that are known to fit the conditions where they are to be grown. The same varieties are not equally adapted to our different desert sections—for instance, the Deglet Nour, which is recognized as the choicest commercial date throughout the world. It is native in the oases of the Sahara Desert, in the hinterland of Algiers, and Tunis.

It does not suit the conditions in the Salt River Valley of Arizona or the Yuma district of the Colorado River, but it does thrive and do well when properly treated in the Coachella Valley of California where it is fruiting very satisfactorily now.

The number of offshoots that can be secured from the Old World of certain of the varieties has been limited both by natural conditions and by arbitrary governmental action, especially in the case of Deglet Nour where the date growers of the Sahara region became alarmed at the prospects of competition from America and at the drainage of the available offshoots of their orchards to establish ours so that they laid an embargo just before the World War broke out against the exportation of Deglet Nour offshoots from Algeria. That embargo still stands, except to the extent that in response to our representations of the situation here and of cooperative constructive date breeding and investigational relations with their specialists, they permitted the shipment to this country of about 1,400 offshoots during the past year. Paralleling that we have secured and now have rooting in the Coachella Valley a still larger number of offshoots of the Saidy date from the oases of the Nile Valley, a variety which ripens in a shorter season than the Deglet Nour and the fruit of which keeps longer after it is cured, and so becomes a late winter and spring date in excellent condition where Deglet Nour is practically an autumn and holiday season date.

Mr. ANDERSON. Will not those dates keep indefinitely after they are put up?

Dr. TAYLOR. If protected from insects, they keep, you might say, indefinitely, except that they gradually dry out and harden and lose something of their palatability. They hold their nutritional value, so far as I know, for a considerable number of years if you can hold them in that physical condition of softness, which we appreciate in a dessert date.

Mr. Anderson. How long does it take one of these trees to come into bearing?

Dr. Taylor. An offshoot of a good variety will begin bearing a little after the age of five or six years; sometimes a cluster at four years, if the tree has made a good start. It will continue in bearing so far as we know—this is based entirely on Old World experience—for from 75 to 100 years. But it will not make offshoots, so that you can enlarge the plantation after it reaches the age of 15 to 20 years. With this slowness of propagation, which is inherent in the tree, there is a natural temptation on the part of new settlers and prospective date growers, to take a short cut to establishing a date orchard by growing seedlings from miscellaneous dates. These seedlings do not come true to the parent variety. In the first place, from 50 to 60, or in some cases 75 per cent of them, are male trees and sterile.

Of the female trees, which bear the fruit, only a very small proportion approximate the character of product of the mother tree. Mr. Swingle, who has charge of this work, has gotten further into it than they have in the Old World. Through close study and correlation of the leaf and tree characters he has been able to locate Deglet Nour male trees to use as pollenizing trees for Deglet Nour females, and thereby to inbreed them. There is reason to hope that through such inbreeding we may be able to develop varieties superior even to those that we are bringing from the Old World, and better adapted to our conditions than these. If we can do that, we have made a long step ahead of what has been accomplished during the thousands of years that the date has been a sustaining food tree for man in arid regions.

Mr. Anderson. Are any of these shoots being brought in by private individuals or corporations?

Dr. Taylor. Your question brings to mind the fact that all the date trees of the Old World are infested with certain species of scale insects which have proved retarding and debilitating to the trees. The offshoots that any one can get from the Old World carry these scales which can not be completely removed so far as known yet by any method of dipping or spraying or fumigation treatment. On the other hand, the young offshoots from these same imported trees are free from scale during a reasonable period, say, the first year or so that it takes them to attain a development that permits their cutting off for rooting so that clean scale-free plantings can be developed through the planting of offshoots of these imported trees. The Federal Horticultural Board has accordingly surrounded all the scale-infested localities with a quarantine in cooperation with the States which prevents the movement out of those areas into scale-free territory of any infested trees and we rely on the holding of the new territory free from scale by planting it only with these clean offshoots from the older trees.

Mr. Anderson. Did you not invent some way of getting rid of this scale after it was grown?

Dr. Taylor. A very effective control has been accomplished and in certain cases after successive years of fumigation and in some cases of gasoline torch burning individual trees have been cleaned. I think it is going to be possible to clean up eventually some of those earlier plantings, at the same time keeping their offshoots clean and getting a clean start on the new territory. The work is proceeding effectively. It was peculiarly fortunate that this money became available as it did for use this year as the conditions abroad were more favorable than they had been for some time and the psychology abroad was favorable also. It is a matter which requires diplomacy as well as pathological accuracy to carry through.

SOIL—BACTERIOLOGY AND PLANT NUTRITION INVESTIGATIONS.

Mr. **Anderson**. The next item is at page 51, soil bacteriology, etc. There is no increase in that item. I do not want to take a great deal of time on it, but my recollection is that we made a little increase in this item last year on the length of day investigations. I want to keep track of the progress we are making as we go along.

Dr. **Kellerman**. This work, Mr. Chairman, has been very actively pushed forward, testing the extent to which the exact period of daylight controls the behavior of different crop plants. The work is in the experimental stage and I suppose a few examples would show what is being done better than anything else. The Maryland mammoth tobacco was mentioned to you last year as one of the most striking examples of a crop which in the long day which it has during its growing period in this climate is unable to produce seed, but it will produce a fine quality of leaf tobacco which grows well and lives up to its name of Maryland mammoth. The shorter day in Florida is a satisfactory length of day for producing seed, and it grows there only to a normal height instead of growing into the mammoth plant.

Dr. **Taylor**. It produces seed as a winter crop in Florida.

Mr. **Anderson**. Will the seed from Florida grow in Maryland?

Dr. **Kellerman**. Yes; it produces the mammoth plant again, so that we can produce our seed in a region where the day is almost the same length as night, and by growing the tobacco leaves in this region of the world where the days are very much longer than the night in the growing season there is the chance of maintaining this very excellent type of tobacco, which until now was always shy of a seed supply. That is one of the minor points which shows a practical application of this length-of-day study. We are finding length of day responsible for some of the curious behavior of the varieties of different crop plants, such as peas. There the experimental work is not completely worked out, but it appears that the change in the latitude will cause apparently identical varieties to show decided differences when they are moved into a different latitude. What may be supposed to be a single variety in one latitude if moved to a different latitude may show a different length of day reaction in different parts of the crop, thus introducing this question of length of day into our investigations of seed supply. That is one of the features of the work that is developing.

Mr. **Anderson**. Do I understand that the seed, for instance, of one kind of plant which is produced in one section of the country if reproduced in another might show differentiations into other varieties in their character, etc.?

Dr. **Kellerman**. That has been known to occur and all sorts of explanations have been given of it. The seed of what seems to be a perfectly true variety in one region breaks up, as we used to say, when it is taken into a new region. Part of that break-up may be due to factors that we do not understand thoroughly, but part of it is due to mixtures of varieties that behave alike under the climatic range where they were, but behave differently when grown in a shorter or longer day. It gives one more way for working out accurately pure seed supplies. The experimental work on some of the things that have been growing in the greenhouses is being continued, and it seems perfectly possible by making the day either too short or too long for a plant to keep it in a vegetative condition and either to make it produce bulbs or some other storage reservoir for food instead of producing flowers, or to keep on growing into a bigger and bigger plant. Whether we are going to find a limit to that factor we really do not know yet. It is undoubtedly tied up with the whole physiology of the plant, and we do not know just where the limits of food supply and of temperature and of light come in.

Dr. **Taylor.** In the case of quite a wide range of plants you can throw the plant into flower quickly by shortening the period of light that it gets during each 24 hours or you can keep it from flowering almost indefinitely by lengthening its exposure to light during the 24 hours with temperature and moisture and other factors all alike. The discovery has made it necessary for all biologists working with plants in their laboratories and experiments to take this question of the length of day into account in their interpretation of the results of their experiments. Prior to Dr. Garner's discovery it was assumed that plants behaved substantially alike if you kept the temperature and humidity conditions alike and let them take the daylight as it came.

Mr. **Anderson.** I do not know why that should not be true. You can make hens lay more eggs by waking them up earlier in the morning.

Dr. **Kellerman.** There is a curious point not yet proved, however, that might be of interest. The specialists in our Bureau of the Biological Survey, in talking over this matter with Dr. Garner, are considering the possibility that the migratory birds are influenced by the shifting length of the day of the changing seasons in the different latitudes and that it is the length of the day that pushes those great groups of animals north and south instead of changes of food supply.

Mr. **Anderson.** Would it not be instinct?

Dr. **Taylor.** Birds arrive about on the calendar date regardless of the particular weather conditions at the time.

Dr. **Kellerman.** And frequently they leave a good food supply to go to places where the food is not as good at certain seasons.

SOIL-FERTILITY INVESTIGATIONS.

Mr. **Anderson.** The next item is, on page 52, for soil-fertility investigations, etc.

Dr. **Taylor.** In this item there is no change.

Mr. **Anderson.** If I remember right, this item is one under which you were making some investigations in regard to the effect of borax deposits in potash. Is there anything new on that?

Dr. TAYLOR. The work, which has been summarized in a manuscript that is now in process of publication, confirms, I think, the forecast that we based on the first year's experiments, which indicated that almost infinitesimal quantities of borax in fertilizers applied to crops at planting time, especially if there was not immediate and heavy rainfall following to leach out the borax, caused injury in quantities as small as 10 pounds per acre, and in some cases as small as 2 or 3 pounds per acre serious damage was done to the young seedlings of such crops as corn, cotton, and tobacco, and in cases of the application of as much as 40 or 50 pounds per acre in company with the normal food supply for the plant damaged the succeeding crop at Arlington farm. Where the borax application was to such a crop as potatoes or corn planted in the spring, cultivated through the summer, and harvested in the autumn followed by a fall seeding of wheat, the wheat was seriously damaged by the undissolved and unleached residue of borax there. It has fully confirmed the forecast of the extreme importance in our whole commercial fertilizer business of avoiding sources of potash and of nitrogen that carry determinable quantities of borax.

Mr. ANDERSON. Has the process of eliminating borax been fully developed?

Dr. TAYLOR. Apparently so. At least, the commercial supplies distributed this last year have, so far as I know, shown no borax. In a few cases where stocks of fertilizer were held over by the farmers from the previous year, before this extreme toxicity was known, there was some damage done, as there was in the year 1920, when heavy losses were encountered in the Aroostook County, Me., potato country, and in Georgia and South Carolina in tobacco and cotton, no considerable losses of potatoes in New Jersey.

Mr. BUCHANAN. What is the best fertilizer for the pecan tree?

Dr. TAYLOR. I wish I knew. We are trying to find that out. We have had some experiments in the south Georgia district in fertilizing pecan trees. I have not the details here, but I will be able to have it summarized into a memorandum which would be a progress report.

Mr. BUCHANAN. Texas is a great pecan State, and the possibilities are great in that line if they could go to work and prosecute the industry. I have had a great many inquiries relative to it.

Dr. TAYLOR. A tree like the pecan, which lives 100 years or more and which only got over into cultivation recently, is not yet understood. It is, therefore, more difficult and takes a long time to get an intelligent understanding of its fertilizer requirements.

Mr. BUCHANAN. I have seen thousands of trees growing wild.

Dr. TAYLOR. Yes. Texas has been a success in that respect. There have been some fine wild varieties, probably equal to anything we have now in the orchard.

Mr. BUCHANAN. They are equal in flavor, but not easily shelled.

Dr. TAYLOR. Some of them are not as easily shelled, although some of them are ideal in their thinnesss of shell and probably better in flavor than many of the cultivated varieties.

FOR INVESTIGATIONS OF COTTON, CORN, AND OTHER CROPS INTRODUCED FROM TROPICAL REGIONS.

Mr. **Anderson.** The next item is on page 53, for acclimatization and adaptation investigations of cotton, corn, and other crops, etc.

Dr. **Taylor.** This is a decrease of approximately $7,500. This paragraph is the one under which all of the fiber-plant work of the Bureau of Plant Industry is carried on—cotton, hemp, flax, and various long fibers such as sisal, henequen, abaca, and others that are not produced in continental United States. You may recall that rather early in the war period when there was an acute shortage of binder-twine fiber due to conditions in Yucatan, we undertook the encouragement of production of binder-twine fibers in the tropical islands, especially in the Philippines, where the plants were known to thrive and where the old hand methods of separation of the fiber from the pulp were in practice. That work has been productive and, we believe, of continuing value in that the planters have taken hold of it and have bought modern machinery and put it into use. They are enlarging the plantations of maguey and sisal, which produce those fibers. This has reached the stage where we feel it is unnecessary for the department to do more than exercise an incidental supervision over it. The money that we have been using for that we accordingly deducted from the estimate, and that is $7,500. I may say in this connection that we are scouting the West India Islands and Central American countries in an effort to find some place on the American Continent, whether under our flag or some other, where the abaca or manila hemp, which is the best rope fiber, the best cable fiber in the world, can be grown. At present the world supply is entirely from the Philippines, and in time of war we are not safe if all the cable fiber has to cross the Pacific. We are doing scouting in the Central American tropical territory and placing with experimenters, mostly North Americans who are located there in connection with banana growing and other industries, experimental lots of abaca plants to get a try out of this important cordage fiber there.

Mr. **Buchanan.** Have you tried the Hawaiian Islands?

Dr. **Taylor.** Yes; but the production conditions there are too expensive; that is, the cost of labor and fertilizer and of irrigation water is too high.

Mr. **Buchanan.** It is certainly produced in the Philippines?

Dr. **Taylor.** Yes.

Mr. **Buchanan.** In close proximity to Japan.

Dr. **Taylor.** This plant is a banana plant; that is, it is a musa, closely related to the banana.

Mr. **Buchanan.** Does it grow in the Hawaiian Islands?

Dr. **Taylor.** It grows there. It is simply a matter of relative cost of production, which is much higher in Hawaii in bananas or anything else of that character than it is in Jamaica or in the West Indies or the Central America banana producing territory.

Mr. **Anderson.** Is this the item under which you have been doing some work in the direction of concentrating the production of varieties of cotton in different specific areas?

Dr. **Taylor.** Yes, sir.

Mr. ANDERSON. Is progress being made in that?

Dr. TAYLOR. Fair progress. We call it community production, through which the cotton growers of a given area concentrate upon a variety which is adapted to their conditions and desirable from the standpoint of price and utilization, thereby stabilizing the production of that section on a high and profitable plane. It makes it possible to avoid the mixing of seed at the gins by having only one variety of seed go through the gin, also to make it possible to bale and class not only by grade, as now classed, but by length of staple also, so that there can be developed a direct contact between the grower and the ultimate buyer of the cotton.

Mr. ANDERSON. That gets you to the point of producing a definite product for a definite market?

Dr. TAYLOR. Yes, sir. The most conspicuous example of this in the West is in the American-Egyptian production in the Salt River Valley of Arizona, where they had not been growing cotton but where it was all under irrigation. They had to cooperate because of that fact, and it was comparatively easy to stimulate a cooperative spirit and develop cooperative associations to voluntarily put this principle into application. A conspicuous example of it that has developed gradually during the past 25 years or so is in the vicinity of Hartsville, S. C., where there has been a development of upland long staple that has been conspicuously successful.

Mr. LEE. I know of that.

Dr. TAYLOR. In various places, especially now since cooperative organizations for the merchandising of cotton are coming up, this great stabilizing of production on a given quality and length of staple is coming, and it is one of the most hopeful signs in the whole cotton prospect.

Mr. ANDERSON. I think it is hopeful from a good many angles. I have a notion in my mind that if you are ever going to get real reforms in distributive processes generally you have got to begin back there in the point of production, producing definite products for a definite market, something that has a definite market value, at least a definite market purpose.

Dr. TAYLOR. If the number of handlers of the product who stand between the producer on the one hand and the spinner on the other is to be materially reduced it must be through shortening the route between those two places. If a particular shipping point can tender so many bales of a given grade and staple and of a particular variety of cotton, you have a basis for doing business which is about as direct as possible. At present, of course, the local buyer has to take what is offered. He gets it and he gives it a rough classing and passes it along to perhaps the next man, who assembles and classes and sells part to this one and part to that, and so on, and you have several way stations on a roundabout route which should be direct rather than circuitous.

Mr. BUCHANAN. This inbreeding of cotton is not an appropriation for the subdivision of the Department of Agriculture by which these cottonseed reports are sent out?

Dr. TAYLOR. Not under this particular paragraph. The new and rare seeds are distributed under another subappropriation in this bill.

Mr. BUCHANAN. When we get to that I will have some observations to make.

TRAVELING EXPENSES—EQUIPMENT AND MATERIAL.

Mr. WASON. I notice, on running my eye over these items in explaining your proposed expenditures in 1923, the item of traveling expenses on page 53 and on the previous pages, and I presume on succeeding pages.

Dr. TAYLOR. There is an analysis of prospective expenditures in each.

Mr. WASON. I notice it here on page 49, page 53, and on page 62, which we have not yet reached. On page 49 your increase of traveling expenses is practically $7,000. On page 53 the increase is practically $8,000. On page 62, which we have not reached, it is practically $7,500.

The cost of traveling is on the decrease a little per mile. Why is it that these increases of that item over your 1921 expenditures show as indicated?

Dr. TAYLOR. I think you will find in several of these cases that the appropriation for the current year was increased beyond the appropriation for the fiscal year 1921.

Mr. WASON. By a deficiency?

Dr. TAYLOR. No; in the regular appropriation bill.

Mr. WASON. Do you mean by that that a new allocation was made?

Dr. TAYLOR. I mean that there was an increase by Congress of this subappropriation for the fiscal year which ended on June 30 last over that which existed the previous fiscal year.

Mr. WASON. Let me see if I understand you, confining it to page 53. Your statement shows expenditures for 1921 at the top of the column. Whether that refers clear down to the last four lines, other objects of expenditure, I do not know.

Dr. TAYLOR. I think so.

Mr. WASON. Do you mean to say by your last answer that $15,171.31 does not represent your traveling expenses for the year ending June 30, 1921?

Dr. TAYLOR. No; I mean that it does. This is that item.

Mr. WASON. If that is so, why, with the decrease in railroad travel, do you put in here for your estimate for 1922 and 1923 the sum of $23,000?

Dr. TAYLOR. I think I see your point, and for full information we would require here to know the amount of the appropriation for the fiscal year 1921, which was not expended. I could not say specifically here.

Mr. BUCHANAN. In addition to the increase of appropriation of 1922 over 1921?

Dr. TAYLOR. Yes, sir.

Mr. BUCHANAN. Your estimates for the next fiscal year are based on the operations of this year?

Dr. TAYLOR. Yes, sir.

Mr. WASON. And the estimate for this year is $112,500, as against $101,410 appropriated in 1921, and this increase of traveling expenses alone is practically $8,000 and in equipment and material is almost $11,000.

Dr. TAYLOR. Perhaps we will get a clearer view of it if we compare the appropriation for the year 1921, which was $101,410. The amount expended for travel in that case was $15,171.31. The current year 1922 appropriation is $120,000. The traveling expense is estimated at $23,000.

Mr. WASON. Or an increase of nearly $8,000?

Dr. TAYLOR. Yes; out of an increased appropriation of $19,000, which occurred at that time.

Mr. WASON. And your equipment and material is an increase over 1922 of practically $11,000?

Dr. TAYLOR. Yes, sir.

Mr. WASON. And $11,000 and $8,000 would be $19,000. Those two items take up the increase which Congress appropriated?

Dr. TAYLOR. Yes, sir.

Mr. WASON. Will you tell me why that is so in view of the reduction in travel rates?

Dr. TAYLOR. You must remember that this estimate was made before there was any reduction in passenger rates, in freight rates, or in subsistence rates. This estimate was formulated last August.

Mr. WASON. Then I understand we can take that into consideration when we write this appropriation up and not follow your estimate.

Dr. TAYLOR. Yes, sir. I should very much regret if you made an arbitrary reduction there, based on the rates that went into effect on the 1st of January without taking into account the expenditure that has been necessary during the first part of the fiscal year.

Mr. WASON. We can not make any reduction in what you are operating under, because this that we are talking about for 1923 does not take effect until the 1st day of July, 1922.

Dr. TAYLOR. I understand, but we have no experience yet under the reduced railroad fares except such as has been accumulated during the month of January, the figures for which are not yet in.

Mr. ANDERSON. I would like to call your attention to the fact that both of these increases apparently occur in traveling expenses and equipment and material, in your item for acclimatization and adaptation of breeding of cotton.

Were there any laboratory materials or any particular travel connected with that item which accounts for these?

COTTON BREEDING STATION, GREENVILLE, TEX.

Dr. TAYLOR. In so far as material is concerned there was a considerable expenditure in the way of shelter and protection for the work in Texas at Greenville, Tex., where the short-staple cotton-breeding work was done, and other facilities provided. Dr. Kellerman reminds me also at the Bard station, which is on the California side of the Colorado River above Yuma.

Mr. BUCHANAN. What do you mean by that station at Greenville; sheds for cotton?

Dr. TAYLOR. Temporary building equipment for the protecting of that work.

Mr. BUCHANAN. Protecting what part of the work? It does not protect the cotton?

Dr. TAYLOR. The seed.

Mr. BUCHANAN. You mean a house to put them in?

Dr. TAYLOR. Yes.

Mr. **Buchanan.** Down there do you have an experimental farm run by the Government or let the farmers do the experimenting?

Dr. **Taylor.** That is handled under a cooperative arrangement through which the land is furnished by a local association.

Mr. **Buchanan.** Furnished and worked and supervised only by the department?

Dr. **Taylor.** Yes, sir; that is, the teams are maintained by the local association so that they are available for the department's use, the department paying for that use.

Mr. **Buchanan.** You are departing from the usual practice, then. As I understand it, the Government furnishes only the cotton seed and probably if they wanted fertilizers, to get the ingredients, the farmer or association of farmers furnish everything else?

Dr. **Taylor.** No; this is a place where the constructive cotton variety breeding work is carried on. This is not an experiment, changing from one farm to another each year, as we do in certain cases, the individual farmers cooperating. This is a definite seed breeding unit, the expense of which in so far as breeding work is concerned is maintained and carried by the department.

Mr. **Lee.** That was established four or five years ago?

Dr. **Taylor.** Yes, sir.

Mr. **Buchanan.** Then, the Government is under obligation to construct a shed or house in which to put the seed?

Dr. **Taylor.** Any facilities which we need other than those on the land when it was made available to us we furnish in the form of temporary construction. See following statement:

STATEMENT REGARDING COTTON-BREEDING STATION AT GREENVILLE, TEX.

Under subproject "Maintenance of improved varieties of cotton," authorized March 21, 1917, a cotton-breeding field station was established at Greenville, Tex., cooperating with field stations of this bureau at San Antonio and Big Springs, Tex., and Lawton, Okla.

This station was established for breeding and cultural experiments and to extend the utilization of improved varieties of cotton through the maintenance of commercial supplies of planting seed of the improved varieties in cooperation with communities that grow a single variety and keep the seed pure.

The station serves as a center of cotton-breeding work for Texas and adjacent States, especially Oklahoma and Arkansas. Increase fields of improved varieties planted by farmers in organized communities are inspected and rogued by field assistants of the department stationed at Greenville. The cooperation of county agents and district leaders is enlisted in the selection of farmers as cooperators in the production of supplies of seed of the improved varieties of cotton resulting from the breeding and testing work of the field stations. The Bureau of Markets cooperates in organizing cooperative cotton-growing communities and in having the lint from improved varieties of cotton classed and graded in comparison with the stocks now being grown in these communities, so that the advantages of organized production of superior varieties may be demonstrated in the most practical way.

Work has also been carried on from this station with the Acala cotton, acclimatized a few years ago from Mexico. This variety also is grown on a large scale in north Texas and Oklahoma on account of earliness, drought resistance, easy picking, and superior quality of fiber, and its cultivation is increasing as rapidly as seed supplies will permit. The fiber attains a length of 1 3/16 inches under favorable conditions and secures a premium of from 2 to 5 cents a pound over short-staple varieties.

Improved cultural methods for securing earlier crops and larger yields of cotton under boll-weevil conditions are also being devised and demonstrated at Greenville and applied in the same general region. The nature of these improvements has been described in the recently published Department Circular 200, Improvements in Cotton Production.

A center of seed supply for the Lone Star variety has developed in north Texas, especially around Greenville, and this variety is now grown largely in the chief producing regions of Texas and adjacent States, probably to the extent of at least 1,000,000 bales. The advantage to the farmers of substituting Lone Star for other varieties is estimated at from $10,000,000 to $20,000,000 a year on a very conservative basis. In Hunt County alone this advantage was estimated several years ago at $700,000.

Mr. Wason. Do you mean to say that your traveling expenses for this next year in performing the line of work which you have just explained to Mr. Buchanan that you have been operating for five years will necessitate, with lower railroad fares, $8,000?

Dr. Taylor. That is our estimate made last August. That covers the travel not only in this country but the travel in foreign countries. It covers the travel during the past six months to the Philippines, and it covers the travel which is now in progress in the Central American Abaca project. It covers the travel which is starting this week in a search for possible boll-weevil resistant varieties of cotton in the Central American countries, where, of course, we have to first reach the country by steamer, and then equip the expedition to take a man into the territory where a vanishing civilization that apparently had cotton, their successors, at least, had cotton, and have continued to grow cotton in there simply by individual shack farm methods in the presence of boll weevil. It is the home of the boll weevil. We are not studying boll weevil but we are studying the crop, and much of the control of boll weevil that has developed so far has come through the finding and the development of varieties that yield good fiber, that mature early enough to get by in the average season before serious boll-weevil damage is done. I could not guarantee this travel estimate as to accuracy, and I do not think anyone could. It is our best guess, taking the prospective season's operations into account.

Mr. Anderson. Do your people travel under tax-free exemptions?

Dr. Taylor. Yes, sir; entirely.

INVESTIGATION, TESTING, AND IMPROVEMENT OF PLANTS YIELDING DRUGS, ETC.

Mr. Anderson. The next item is on page 54, for the investigation, testing, and improvement of plants yielding drugs, spices, poisons, oils, and related products. There is no increase in that item?

Dr. Taylor. There is no change in the item. I will say briefly that there are two features of work conducted under this paragraph. One of them is devoted to the study of those possible drug crops which it seems worth while to look into with a view to determining whether they can profitably be grown in this country rather than be imported; crops like beladonna and other important drug crops; also the technical study of those poisonous plants which trouble stockmen and ranchers to a considerable extent in the national forests, and also on the ranges, and to some extent in the older settled farming portions of the country.

The second feature of the work that is covered by this is a line of technical physiological laboratory investigations in which the life processes of plants in their development are being studied by physiological and chemical methods cooperating with the pathological specialists where a question of immunity of a variety or type of plant to a particular disease is involved. They are endeavoring to get back into the unexplored or relatively unexplored portions of the field of plant physiology.

FOR CROP TECHNOLOGICAL INVESTIGATIONS.

Mr. **Anderson.** Page 55, for crop technological investigations, including the study of plant infesting nematodes.

Dr. **Taylor.** In this paragraph for crop technical investigations of nematodes, the appropriation for which this year is $24,940, we are asking an increase of $7,500.

A nematode is a microscopic worm such as causes the root knot of the fig tree and sometimes on cotton, tomato, and on many cowpeas, soy beans, and on many of our other crops.

Mr. **Buchanan.** Is that what causes a fig tree to die?

Dr. **Taylor.** It is probably the most important cause in our Gulf States. It has not been so serious on the fig in California.

Mr. **Buchanan.** It is very prominent in Texas.

Dr. **Taylor.** In the whole coastal portion of Texas and the other Gulf States.

Mr. **Buchanan.** They die in my garden every three or four years.

Dr. **Taylor.** These little organisms which in general live in the soil and attack the roots of plants do, in at least the case of wheat, find their way up through or with the growing stalk of wheat and eventually kill the kernel of the wheat. That has been the case in Australia to a destructive extent and that particular nematode has been found within the last three years in the Shenandoah Valley of Virginia. The most widely destructive nematode work is in the Gulf States. This is due to a single species of the nematode that does not seriously trouble plants when you get north of a line where the soil freezes every winter to a depth of 6 inches or so. That degree of freezing does not kill all of the organisms, but holds them in check. Another species is attacking and putting out of use sugar-beet acreage in the irrigated areas in some portions of southern California and of Colorado and of Utah, where the factories have been built of a capacity to take care of and work up the tonnage of beets that can be produced within a normal shipping range of the factory. Anything that interferes by reducing the normal production of the tonnage cuts right into the factory efficiency and to that extent makes it useless.

The life history of these organisms is as yet imperfectly understood and the methods of field control have not yet been developed except in a few cases. One species of nematode is attacking and seriously damaging clover and alfalfa in the Pacific Northwest, in Idaho and Washington, a section from which some of our best clover and alfalfa seed comes. It is, therefore, disquieting in that it raises the possibility of a spread of the organism to the corn belt in the older territory that gets much clover seed from that region. That particular species has not yet been found in the East. It is doing serious damage in particular reclamation projects in the Northwest, however, and we feel that this is the time to go after it and head it off if there is any way of doing that.

Mr. **Anderson.** This is one of the items where there appears to be an increase in traveling expenses that Mr. Wason was talking about.

There appears to be an increase from $84.44 in 1921 to $4,600 in 1922. Will you tell us what was the occasion of that, if there was any?

Dr. TAYLOR. The $84 year was an indoor year. Much more extensive field work is contemplated next year.

FOR STUDYING AND TESTING COMMERCIAL SEEDS.

Mr. ANDERSON. The next item is on page 56, for studying and testing commercial seeds.

Dr. TAYLOR. This, on page 56 in the paragraph for studying and testing commercial seeds, includes all of what we call our bureau pure seed work. It involves the collection, testing, and determination of adulteration, and then publishing all of the cases of adulteration as authorized by the language of the paragraph.

It also includes the enforcement of what is known as the import seed law through which the Department of Agriculture tests samples of all agricultural seeds that reach our ports of entry. These samples are taken by the custom-house officers under our general stipulation as to methods of sampling and forwarded to the department for determination of purity and viability. The admission of the seed to the country depends on the approval by the department of the import samples.

Mr. ANDERSON. Do those seeds have to be sent or the samples have to be sent to Washington now?

Dr. TAYLOR. Yes; in the main. In a few cases where they enter Pacific coast points the tests are made at the cooperative seed testing laboratory that we maintain in California. This has been at Berkeley in cooperation with the university until the 1st of January, when it was transferred to Sacramento to the State department of agriculture, which, under a new State law, now has authority in California to make such tests to determine intrastate questions.

Mr. WASON. That is done by your authorization and approval?

Dr. TAYLOR. The import samples are tested by our joint employee. In so far as action under the import seed law is involved, we control. In so far as intrastate matters are concerned, the State controls.

Mr. ANDERSON. How much of this examination is there that justifies the placing of a man in New York?

Dr. TAYLOR. The situation there is this, that the custom-house officers, while they are willing to, and, I think, do, the best they can, take the samples in a routine way, and they are not keen on the practices which sometimes are followed in the seed trade. We are not satisfied that we always get samples that are truly representative of the shipments. The stove piping of sacks of seeds is not at all an unknown art where seeds of high prices per pound are involved. Shipments are sometimes so handled that there can be a scattering through a large consignment of a considerable number of sacks that are actually far below the remainder of the shipment in quality. We feel that a thorough and efficient administration of the import seed law requires that we should have at the port of New York where a large proportion, I should say, at least, three-fourths of these seeds that enter the United States, come, a man who is experienced and qualified on the job during the whole period of the unloading and warehousing and handling of the imports.

Mr. Anderson. Would this man be a sampler or a tester or both?

Dr. Taylor. He would be a sampler; an experienced seed sampler with sufficient knowledge of seed and of the practice of the seed trade to function effectively there as the representative of the department, forwarding here for the complete laboratory test the samples that he takes.

Mr. Anderson. He would not be a man who would make a test himself? This is a sampling proposition?

Dr. Taylor. No, sir; this is a sampling proposition. The question is one of extreme importance at times when there is a domestic shortage of clover or alfalfa or other important crop seed that sometimes brings in foreign seed in floods on short notice from all parts of the world.

Mr. Anderson. How many samples do you get from the port of New York in the course of a year?

Dr. Taylor. I will have to ascertain that. The importations that the samples represent sometimes run as high as twenty or twenty-five million pounds of even a single type of seed like red clover, sometimes amounting from 20 to 25 per cent of the total quantity sown on American farms. See statement below:

STATEMENT.

During the fiscal year 1921 the seed-testing laboratories of the Bureau of Plant Industry received and examined 23,113 samples of seeds. These samples represent both vegetable and field seeds rceived from farmers, seed dalers, and investigators to whom reports of analyses were sent, showing the presence of weed seeds and worthless material, or germination, or both, as requested.

The total number of importations received and examined, subject to the seed importation act, during the same period was 2,959.

Mr. Anderson. Do they usually come in sacks?

Dr. Taylor. They come in sacks always, and they come through various ports in various countries. Certain ports make a business of assembling a particular kind of seed, such as clover seed, from wherever it can be bought throughout the world and then forwarding it to American purchasers without indication of its place of growth or origin. The department work has unquestionably raised the quality of our imported field crop seeds decidedly, judging from the smaller percentage of consignments that had to be rejected during the last two years, in comparison with the earlier periods. The present law and methods, I will say, however, are not adequate to protect the American farmer in some of the very important features. For example, the import seed law makes possible the exclusion of seed that has bad seed in it or any seed that does not come up to a specified rather low standard of viability. This is 60 per cent in the case of red clover.

Mr. Anderson. This is quite generally graded down to that standard.

Dr. Taylor. That is one possibility. The present law does not enable us to exclude or in any way require the labeling or authentication of seed that comes from countries which are so much warmer in winter than our red clover regions that the seed is not hardy enough for our territory. We are at work on a proposed method which we shall probably be ready to submit to Congress for consideration before long involving a method of authentication which will be effective so that the seed in a sack of Italian or other Mediterranean region clover seed that enters the United States could be identified later either in toto or as a portion of a blend. The proposal may at first glance seem radical, but we think it will work if Congress authorizes it.

FOR THE INVESTIGATION AND IMPROVEMENT OF CEREALS, ETC.

Mr. ANDERSON. Page 57, for the investigation and improvement of cereals, including corn and the methods of cereal production, etc.

Dr. TAYLOR. Page 57 is the subappropriation under which our investigation and improvement of the cereals, including corn, is done and the investigation of methods of cereal production and for the study and control of cereal diseases, including barberry eradication, and for the investigation and cultivation of flax for seed purposes, including a study of flax diseases and for the investigation and improvement of broom corn and methods of broom-corn production.

The language of the subappropriation, as you will notice, has been somewhat changed in an effort to clarify and make more specific the authority that it gives.

The total appropriation for the current year is $379,705. This is altogether the largest research activity in the field of crop plant work done by the department, and the estimate provides an increase of $14,000, which it is proposed to use for agronomic work in addition to a similar amount now devoted to cereal disease work under language which is stricken out. The purpose is to restore the agronomic phases of the work to approximately their prewar level.

As the result of the tense emergency that developed during the war, when the question of control of diseases and food production was uppermost in all minds, this subappropriation was somewhat disorganized as a result of amendments and provisos and stipulations, some of which originated in the House and some in the Senate, so that the paragraph as it stands is rather lopsided and is not clear in its meaning. We have endeavored to clarify it and restore what we consider the necessary balance between the agronomic experimentation features and the pathological features that affect cereal crops. As is noted in the explanatory paragraph, during the fiscal year 1921 the appropriation for this item, exclusive of the amount set aside by provisos for specific investigations was 50 per cent, decreasing the amount from $140,000 to $112,000. That amount was spared from what is necessary to carry forward agronomic investigations. We have quite a group of cereal experts that are not excelled, and I think I am safe in saying not equaled anywhere else in the world. We have them under way, but lacking certain necessary field facilities, including travel, because that is quite an important item involved here, we would like to restore the balance involved here and add $14,000 on account of that.

FOR LOCATION AND DESTRUCTION OF BARBERRY BUSHES, ETC., FROM WHICH RUST SPORES ORIGINATE.

Mr. ANDERSON. How much of this appropriation do you expect to expend this next year on barberry extermination work?

Dr. TAYLOR. Substantially $140,000 as carried for the present year.

Mr. **Anderson.** That particular item usually excites a good deal of interest. I wish you would tell us how well that work is organized and how far it has progressed.

Dr. **Taylor.** I will ask Dr. Kellerman if he will outline that briefly to the committee?

Dr. **Kellerman.** Mr. Chairman, the organization is cooperating with the different States concerned, the attempt being to place a State leader in each of the 13 States cooperating, and in this way bring about the harmony of action in the different States. The work as it is now conducted is designed to clean up as nearly as it is humanly possible to do so the different areas, in the spring wheat areas first, but gradually extending out with the hope of getting the entire northern belt of the wheat States cleaned within a few years; the exact time that that will take we have not tried to determine. I am not sure I understand just exactly what development you want me to outline particularly.

Mr. **Anderson.** Well, I do not know exactly how to express it myself.

Dr. **Kellerman.** We are planning a campaign of education to show just what the rust means and what kind of precautions are necessary in conducting a thorough eradication campaign. In the beginning it was shown clearly that in most areas that found difficulty in getting rid of the barberry, there was not sufficient care in getting rid of all parts of the plant and root. Also there was difficulty of getting rid of small plants and bushes in pastures and in woodlots where they were not likely to be seen, and yet were potential starters of rust epidemics. In the preliminary cleaning in North Dakota, for instance, the State thought they had the whole State cleaned, yet upon a careful survey it was shown that there were scattered barberry plants practically throughout the area. Most intense cleaning up is the keynote of the campaign.

Mr. **Anderson.** Is this cleaning up being done now? Is the department doing it, or is it simply supervising it or what?

Dr. **Kellerman.** The department is supervising it, not doing the digging. That does not mean that the department's man would refuse to dig out a barberry if he finds it in order to get rid of it, but the campaign is carried on almost entirely by the State. The department's men are primarily organizers and teachers and supervisors. They will aid in eradication work both to show how it should be done and in the scouting work and even personally handling the eradication work when that is the most efficient way of getting it done, but in general the department's men act as teachers and advisers.

Mr. **Anderson.** How many men have you in this work now?

Dr. **Kellerman.** That would show in a general way in the Budget. I think the barberry scouts are not separated out, but it would be possible—the 21 agents we have down here are all barberry agents, so that in general I think we would be safe in saying that we have somewhere in the neighborhood of 30 people.

Mr. **Ball.** I think I could present a little clearer what the chairman is trying to get at than you have. In the beginning, Mr. Chairman, it was supposed that practically all the barberries were in the towns and cities, and the first work was to go over the States and get them out of the towns and cities. That work has been completely done for the entire area of the 11 or 13 States in that region. For that particular region, in North Dakota, they thought they were done and found the rust again, and then they began again and found that there had been many barberries found on the farms, and then they took up the work of cleaning up the barberries on the farms. That came very largely through my insistance. That work was done so as to bring the areas together; the area in southeast South Dakota, northwest Iowa, northeast Nebraska, and southwest Minnesota. Those are the four States working together on cleaning up an area that will be entirely clear of barberry. In addition to that we have another area that we are working on comprised of areas in Ohio, Indiana, and Michigan, northwestern Ohio, northeastern Indiana, and southern Michigan. First we are making the cities clean up; next we are making the farms clean up the areas, and it has progressed far enough so that we have an area in there of Iowa, Nebraska, South Dakota, and Minnesota that is nearly as large as a State, and each year that area will be added to.

Mr. **Anderson**. Is the sale of the kind of barberry that is responsible for this rust disease being stopped at the source so that we are not going to have any more of this trouble?

Dr. **Kellerman**. The National Nurserymen's Association has agreed to stop the sale of it everywhere in the United States, and it is forbidden by law in all the States where the work is going on.

Mr. **Buchanan**. What is a barberry?

Mr. **Ball**. It is a little berry that grows on a bush. If you will notice as you go down the hill around the corner down here near the Capitol, you will find a little bush that has a little red berry on it. That is the Japanese barberry and is harmless. The one that does the harm is the European barberry.

Mr. **Buchanan**. Has it any other common name?

Mr. **Ball**. No. Barberry is the common name.

Mr. **Buchanan**. Does rust usually come from anything else, such as climatic conditions?

Dr. **Kellerman**. No. Rust epidemics start from those plants; in this western region the spores can not live through the winter except on these bushes. Rust epidemics will not be serious if weather conditions are not right. It can not start except from barberry plants.

Mr. **Buchanan**. If the barberry was completely destroyed in my State, would that section of country be free from rust?

Dr. **Kellerman**. I am sorry to say it would not. Your section is far enough south, so that the rust will live over winter. The spores can start from certain grasses in the South. But after you get north of the frost line the spores are more and more often killed. When you get north into the States that comprise the bulk of the wheat area of the country it is seldom the spores will live over winter.

Mr. **Buchanan**. That presents a proposition where you can completely eradicate it in the northern climate when you would not eradicate it in the southern climate.

Dr. **Kellerman**. Yes. With reference to a question here of the progress of the work, I think the statement may be made that the work of the resurvey is about one-third done.

Mr. **Buchanan**. You do not mean by resurvey that it is to be resurveyed, but you mean by that that it has been cleaned out?

Dr. **Kellerman.** Yes, sir. The word "survey" means there that it is cleaned out.

Mr. **Anderson.** Usually the word "survey" means that it has been looked at and nothing done.

Dr. **Kellerman.** It does not mean that here.

Mr. **Buchanan.** Let me make this statement: The appropriation is supposed to be larger than ever before. Will you prepare a short, concise statement how much damage has been done by this disease?

Dr. **Kellerman.** Those have been made in earlier hearings, Mr. Buchanan. We hope the complete epidemics are done now.

Mr. **Buchanan.** There is a lot of discussion about this item, and since that statement was made in the former hearing there are many new Members of Congress. I do not mean a long statement, but just a little. short statement.

Dr. **Kellerman.** Twenty million bushels is probably the heaviest loss in any one year in the spring-wheat area. I can give you a statement of the properties surveyed and the number of bushels destroyed if you want them.

Dr. **Taylor.** We could furnish you with a statement boiled down that would cover this barberry eradication, first, what the damage has been that we are endeavoring to correct, and second, how far we have got in the clean up of the territory where the damage was done. We could boil that down to a compact statement in the record if you would care for that. The statement follows:

PROGRESS OF THE BARBERRY ERADICATION CAMPAIGN.

The campaign for barberry eradication in cooperation with the 13 north-central wheat-growing States, Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming, begun in the spring of 1918, has now completed its fourth year. Results for 1921 and for the four-year period follow:

In 1921, all efforts were concentrated on the farm-to-farm survey, although a resurvey of cities and villages in the counties covered was carried on at the same time. An area equivalent to about 142 counties was completed. Of these, [illegible] counties in Minnesota were surveyed on funds furnished by that State. On [illegible] properties 165,662 bushes were located. Of these, 100,659 were escaped bushes on 553 properties. A total of 199,647 bushes was removed from 6,317 properties. In the resurvey, 21,956 sprouts were found and eradicated, and numerous seedlings also were found.

Investigations have been started which it is hoped will give us a successful method of eradicating both mature bushes and seedlings by chemical means. Mature bushes, both with the tops of the bushes remaining and the tops removed, are being treated with various oils, poisonous chemicals, and chemicals that give off destructive gases. Investigation is under way to find a gas-producing chemical that may be inserted into the ground among the roots to cause immediate and complete destruction. Seedlings and sprouts are being sprayed with chemicals that will cause them to wither and die immediately. This work is being pushed as rapidly as possible.

During the four years from April 1, 1918, to January 31, 1921, almost all cities, towns, and villages in the 13 States of the eradication area were surveyed. All rural work is completed in Montana, Colorado, and Wyoming. An area of approximately 321 counties was covered in the original survey. Resurveys were made in a portion of these counties only. Every property on which barberries were found will need to be resurveyed next year. A total of 5,619,971 bushes was located on 49,926 properties. Of these, 3,295,185 were escaped bushes on 2,362 properties. A total of 4,443,826 bushes was removed from 45,584 properties. Of the 1,176,145 bushes remaining on 4,362 properties, about 1,000,000 are escaped bushes, most of which are not 18 inches in height, on three large escaped areas in Wisconsin. These results include 10,000 bushes found and removed from 20 properties in cities and towns in North Dakota in

1917, which have not been included in previous reports. This work was done on State appropriations.

Table 1 gives a summary of the results by States for the period January 1 to December 31, 1921.

Table 2 shows the results, by States, for the four-year period, April 1, 1918, to December 31, 1921.

The large map accompanying this résumé shows in black the areas that have been completed in city and village surveys. The area which has been dotted is thinly settled and probably has very few barberries. In the area cross-hatched one way the cities and towns have been surveyed, but the farm-to-farm survey must be carefully made. The portion of this colored red indicates the area that we hope to cover during the field season of 1922. The portion colored green indicates the area that we hope to cover during the field season of 1923.

Resurveys are necessary over the entire black area and over the areas added annually in order to be sure that all bushes located have been carefully removed and that no sprouts or seedlings shall remain. With our present methods of eradication two and three inspections are necessary. We have hopes that chemical eradication will obviate some of this resurvey work.

TABLE 1.—*Data showing results obtained in the barberry eradication campaign from Jan. 1 to Dec. 31, 1921.*

State.	Number of properties having bushes—				
	In cities and towns.	In country.		Total properties.	Cleared of bushes.
		Escaped.	Total.		
Colorado	31	9	52	83	85
Illinois	1,264	153	478	1,742	1,475
Indiana	55	36	119	174	165
Iowa	18	33	197	215	770
Michigan	288	62	256	544	654
Minnesota	56	33	211	267	270
Nebraska	43	12	162	205	312
North Dakota	31	1	55	86	86
Ohio	804	24	229	1,033	1,696
South Dakota	9	32	145	154	119
Wisconsin	147	158	393	540	655
Wyoming	4	....	6	10	30
Total	2,750	553	2,303	5,053	6,317

State.	Number of bushes.					Sprouts found and removed in the resurvey.
	In cities and towns.	In country.		In both cities and country.		
		Escaped.	Total.	Found.	Removed.	
Colorado	607	14	299	906	1,212	630
Illinois	12,835	23,434	33,203	46,038	31,030	1,675
Indiana	263	1,732	2,312	2,575	2,424	608
Iowa	54	2,943	7,073	7,127	11,937	3,619
Michigan	3,409	18,217	28,220	31,629	27,602	144
Minnesota	630	2,641	7,143	7,773	8,022	5,265
Nebraska	296	2,384	6,281	6,577	14,741	1,951
North Dakota	298	150	1,925	2,223	2,223	276
Ohio	3,360	4,565	5,645	9,005	25,475	2,281
South Dakota	299	5,168	9,550	9,849	8,803	655
Wisconsin	1,201	39,411	40,719	41,920	65,628	4,802
Wyoming	14	....	26	40	550	50
Total	23,266	100,659	142,396	165,662	199,647	21,956

TABLE 2.—*Data showing results obtained in the barberry eradication campaign from Apr. 1, 1918, to Dec. 31, 1921.*

State.	Number of properties having bushes—				
	In cities and towns.	In country.		Total properties.	Cleared of bushes.
		Escaped.	Total.		
Colorado	1,499	19	97	1,596	1,593
Illinois	7,724	346	794	8,518	7,773
Indiana	3,136	55	472	3,608	3,574
Iowa	6,684	205	1,016	7,700	7,693
Michigan	3,874	905	3,625	7,499	5,566
Minnesota	2,778	215	1,001	3,779	3,737
Montana	152	1	43	195	194
Nebraska	2,978	17	265	3,243	2,907
North Dakota [1]	474	1	145	619	619
Ohio	4,490	65	555	5,045	4,318
South Dakota	381	65	289	670	576
Wisconsin	5,927	467	1,440	7,367	6,980
Wyoming	74	1	13	87	54
Total	40,171	2,362	9,755	49,926	45,584

State.	Number of bushes.					Sprouts found and removed in the resurvey.
	In cities and towns.	In country.		In both cities and country.		
		Escaped.	Total.	Found.	Removed.	
Colorado	19,172	1,411	3,376	22,548	22,457	3,226
Illinois	92,500	25,635	42,289	134,789	114,897	2,336
Indiana	75,288	4,173	12,446	87,734	86,342	2,460
Iowa	642,544	32,216	89,196	731,740	731,545	6,502
Michigan	39,360	76,960	131,916	171,276	119,878	189
Minnesota	588,734	53,509	152,574	741,308	741,087	15,427
Montana	6,577	1	2,105	8,682	8,671	4,515
Nebraska	71,296	3,185	12,338	83,634	82,934	3,276
North Dakota [1]	14,080	150	3,035	17,115	17,115	491
Ohio	197,120	19,774	25,747	222,867	199,367	2,281
South Dakota	22,223	14,407	23,812	46,035	38,908	1,568
Wisconsin	276,673	3,063,763	3,071,430	3,348,103	2,279,583	13,086
Wyoming	3,946	1	194	4,140	1,042	240
Total	2,049,513	3,295,185	3,570,458	5,619,971	4,443,826	55,597

[1] The results for North Dakota include 10,000 bushes found and removed from 20 properties in cities and towns in 1917 which have not been included in previous reports.

INVESTIGATION OF CONTROL OF RUST.

Mr. ANDERSON. Are you still spending $50,000 on the investigation of control of rust?

Dr. KELLERMAN. Approximately that; yes. We have been spending that sum for a considerable time, Mr. Anderson. That is one of the things we would like to reduce slightly in connection with the regrouping of our work as provided in this paragraph. The pathological work has grown steadily. The agronomic work has not kept pace with it.

Mr. ANDERSON. You use the word agronomic. In a general way, I think that we all understand what it means, but I think if you put it in different language we will get it a little better.

Dr. TAYLOR. Perhaps this will help. Agronomy is a part of agriculture. It is that part of agriculture which deals with the development and culture and growth and production of cultivated economic plants in distinction from agriculture itself, which includes live stock and the various other features than the mere growth and cultivation of plants.

Mr. ANDERSON. You do not include any disease work or anything of that kind? It is very largely cultural?

Dr. TAYLOR. Yes.

Mr. ANDERSON. Any breeding?

Dr. TAYLOR. Agronomic work covers all the breeding and improvement of varieties, improvements in cultural methods, whether those relate to tillage or to fertilizers, or to handling in any way; to proper rotations, to the interrelation of grain crops to clover or any other crops that may be grown in a rotation. It is the plant side of agriculture.

Mr. BUCHANAN. Everything that occurs in the field?

Dr. TAYLOR. Yes; pathology covers the diseases of the plant.

Mr. BALL. This bureau which Dr. Taylor is presenting here, the Bureau of Plant Industry, contains one-half of the departments that the Agricultural Department ought to have. It contains horticulture, agronomy, plant diseases, plant pathology, plant bacteriology, soil bacteriology, botany, all in one department here, and this single item covers the entire subject handled by the Department of Agronomy and then some. Incidentally, I might say that this Bureau of Plant Industry handles over one-fourth of the research work of the Department of Agriculture. We have 17 bureaus, and over one-fourth of our work is in this bureau in research lines.

Dr. TAYLOR. Dr. Kellerman, will you discuss this next item which is closely related to this, on page 59?

FOR INVESTIGATION OF FLAG SMUT OF WHEAT, TAKE-ALL, ETC., AND OTHER DISEASES.

Mr. ANDERSON. The item on page 59, which is an item to enable the Secretary of Agriculture to meet the emergency caused by the existence in the United States of flag smut of wheat, take-all, and other destructive soil and seed infecting diseases of wheat and of other cereals.

Dr. KELLERMAN. You will remember that item was brought into the appropriation act because of the grave danger attending the appearance in the United States of two serious diseases, the take-all disease and the flag-smut disease, both apparently introduced from Australia. Careful field studies have shown that neither of these diseases is widely spread, and we are accordingly recommending reduction in the appropriation. The only serious area of infection at the present time is the area in Illinois near St. Louis, where the flag smut appears to be established in Madison County.

Mr. ANDERSON. What does that attack?

Dr. KELLERMAN. That attacks wheat. It is a destructive head smut of wheat. If it can not be checked it is likely to spread and become a serious problem throughout the Middle West wheat belt. Accordingly, in cooperation with the authorities of the State of Illinois, we are maintaining a very strict supervision over the farms in the district and a safety zone around the district believed to be infected. All of the thrashing machines that are taken in there, for example, are used last in the infected region and are carefully sterilized with formaldehyde before they are moved off from any infected farm; all wagons used for hauling are sterilized. The wheat is also fumigated at the separator so that the wheat when moved from out of that region is believed to be free of any living spores. In addition the smut straw is held under strict quarantine. Practically all of it is burned.

Mr. **Anderson**. Is this a considerable wheat-growing section?

Dr. **Kellerman**. It is an area of large yield per acre. While the totals do not look very large, the yields run very high, and it is about the only good cash crop for that region. For that reason it is almost impossible to get rid of that crop entirely.

Mr. **Buchanan**. About what is the acreage of that region?

Dr. **Kellerman**. Well, it is an area of about 10 square miles, a little over 6,000 acres.

Dr. **Taylor**. It is a Mississippi River bottom-land district, a little above St. Louis, on the Illinois side.

Mr. **Anderson**. It has not spread, so far as you know, out of this particular section?

Dr. **Kellerman**. There is one spread this year. Just south of the county line is where the new fields have been found infested.

Whether those were infested previously and just discovered, or whether they were infested for the first time this year, we have not discovered, but it is believed the spread came through the high water of this past year, so that so far as we know the infested area is entirely under control. The present plan of quarantine is believed to be as much as could be put into operation, and accordingly the present fund for cooperative work in Illinois is believed to be satisfactory.

The take-all disease, fortunately, is not only extremely small in amount, but even in the areas where it was first found it appears to be on the wane rather than on the increase, and we are not particularly worried about that disease.

Mr. **Buchanan**. There is not as much damage by that disease as the name indicates?

Dr. **Kellerman**. We believe not, although we are not sure that under some climatic conditions it might not take all the crop as it apparently does at times in Australia.

Mr. **Lee**. If you were to stop planting wheat for one year, would it eliminate the rust?

Dr. **Kellerman**. We believe it would be necessary to stop more than one season. If it were one season only, we believe possibly we would be able to get the cooperation of all the planters; and we believe that if we had the guaranty that we had all of the area entirely within our quarantine lines that we could get sufficient backing to eliminate wheat growing there, anyway. But there is a chance that we have not got the outside borders of the infected wheat-growing area, and because of the very heavy loss of prohibiting wheat growing in this area without being able to eradicate it——

Mr. **Anderson** (interposing). Has there been any improvement in the situation through the development of resistant varieties?

Dr. **Kellerman**. That is what we are working on now. We have found many varieties for this region that are quite resistant to flag smut. They are not quite immune, but almost entirely immune.

They are requiring the growing of these resistant varieties in this region. We hope by growing only resistant varieties that we will get rid of that disease without any great loss to the people concerned.

INVESTIGATION AND IMPROVEMENT OF TOBACCO, ETC.

Mr. **Anderson**. The next item is on page 60, for the investigation and the improvement of tobacco and the methods of tobacco production and handling.

Dr. **Taylor**. This covers all the work done on tobacco production. There is no change recommended regarding the appropriation. The work is proceeding productively and satisfactorily in cooperation with the States with which we are working, which include Wisconsin, Pennsylvania, Virginia, North Carolina, South Carolina, and Georgia, and the present appropriation with close economy will carry it.

Mr. **Anderson**. I think that there was an increase last year that was to be devoted to some investigations of tobacco-sick soil in Connecticut and some new situation in Georgia, I believe?

Dr. **Taylor**. The work in Georgia was started in the new fire-cured tobacco district of south Georgia, which centers around Tifton. In that we have begun since the 1st of July in cooperation with the State a line of tobacco experimentations similar to that which has been very successful in the older eastern tobacco territory. The tobacco crop is so sentitive to the character of fertilizer used and has proven so sensitive to the effect of those crops that grow in the rotation just ahead of it as affecting its yield and its burn and aroma and other qualities that money is paid for, that systematic, rather prolonged crop rotation experiments are necessary to determine how to maintain a permanent tobacco production. The reputation that tobacco has acquired as a soil-exhausting crop is to a certain extent due to the fact that it has been grown in many sections almost continuously year after year on the same soil, applying commercial fertilizer to replenish the plant food that the crop requires. Now, that apparently was because the tobacco growers found so much trouble resulted from the introduction of rotation crops in their tobacco fields, certain crops having such a bad effect upon the quality of the tobacco, that it has required a very comprehensive and thorough-going agronomic test before recommended rotations could be developed. We are convinced that there is no reason why there should not be maintained, in a region that is favorable for tobacco and a soil that is suitable for tobacco, a permanent tobacco industry in which other crops shall play a part and the yields of the other crops be materially increased over their yields as ordinarily grown.

But if a tobacco-damaging crop, even though it may be a soil-improving crop, be introduced in the rotation, such, as for instance, hairy vetch (which is a cover crop that is one of the best for green manuring and furnishing the nitrogen), is introduced in rotation the effect upon the leaf of the next succeeding tobacco crop is disastrous. So that in the new south Georgia district, which has developed practically entirely within the past six or eight years, we are undertaking now the same sort of work that has been so helpful in the older territory.

BREEDING AND PHSIOLOGICAL STUDY OF ALKALI-RESISTANT AND DROUGHT-RESISTANT CROPS.

Our next subappropriation, Mr. Chairman, is on page 61, for the breeding and physiological study of alkali-resistant and drought-resistant crops. No increase is asked in this item. The work is applicable almost entirely to the arid West and especially the Southwest, where, under irrigation agriculture, alkali frequently becomes the limiting factor in the agricultural use of the land. The experience of man in the use of water in arid regions since he began to irrigate in the Old World has not yet developed any sure method of preventing nor any certain cure for alkali trouble where there is seepage from higher lands that contain alkali. The work done under this paragraph is, in the main, directed at locating crops that will endure some alkali and then the improvement of these to the possible limit of their efficiency as economic crops.

The most conspicuous example thus far that has come out of this is the Pima variety of Egyptian cotton, which has been developed in the Salt River Valley. This resulted, first, from the introduction of seed from Egypt of what was regarded at that time as their best cotton, and which endured more alkali than most of the crops that can be grown in the Southwest. Then the development by careful, patient, continued selection methods of the pure strain, and then the increase of that strain to a quantity which made it practical to start commercial production in a restricted area within which the farmers agreed to plant nothing else. Out of this grew quickly an effective marketing organization, which made possible the classing and selling by the producers themselves direct to the spinners, either domestic or foreign, who want that type of cotton and were in position to pay for it.

Mr. **Lee**. How many 500-pound bales did they produce?

Dr. **Taylor**. The production in 1920 of the Pima cotton was approximately 90,000 bales. The crop for 1921, on an acreage very materially reduced as the result of the adverse price and market conditions, is estimated at 35,000 bales. This is our only Egyptian type cotton production in this country. A considerable proportion of it is taken by the automobile tire fabric and cord manufacturers. In fact, certain of the manufacturers have bought and developed plantations of their own in order to get a considerable supply of their own raising.

Mr. **Lee**. Do you recall the length of the staple?

Dr. **Taylor**. An inch and three-eighths to an inch and one-half.

Mr. **Buchanan**. Is there any long staple, big boll cotton?

Dr. **Taylor**. Not as long as the Egyptian.

Mr. **Buchanan**. Have you ever tried to investigate to find out why invariably all long-staple cotton has little bolls?

Dr. **Kellerman**. These are not little bolls. They are the Egyptian bolls. The Acala boll is larger than that. The Acala cotton will run a full quarter.

Mr. LEE. Is that an upland cotton?

Dr. KELLERMAN. That is an upland cotton and that is a large boll cotton and will run a very large yield.

Dr. TAYLOR. That is being very heavily planted now in portions of Oklahoma.

Mr. BUCHANAN. And Mississippi, is it not?

Dr. TAYLOR. I think less in Mississippi. Both Acala and Durango were developed from introductions made from Mexico and Central America. The original stocks were picked up in Mexico, where they had been grown apparently for an indefinite time under conditions that were very primitive.

FOR SUGAR PLANT INVESTIGATIONS, ETC.

Mr. ANDERSON. The next item is on page 62 and is for sugar plant investigations, including studies of diseases and the improvement of sugar beets and sugar-beet seed.

Dr. TAYLOR. Our appropriation for sugar plant investigation including a variety of diseases and of sugar beet seed production is under this paragraph. This is the paragraph under which all the sugar production work, including the investigation of the diseases that trouble both beets and cane, is conducted. The estimate provides no change in comparison with the present appropriation.

Mr. ANDERSON. Has a method been developed so that you can produce sugar beet seed here now satisfactorily?

Dr. TAYLOR. Yes. Sugar beet seed under pressure of war necessity was grown by several of the large sugar companies, of satisfactory quality and with fair yields of seed per acre. Under the conditions that obtained it cost more per pound than imported seed could be obtained for. Previous to the war our whole supply of sugar beet seed had been imported largely from Germany and Austria, though some of the so-called German seed was grown in Russia and controlled by German shippers. The slump in the sugar situation which occurred a year ago troubled the companies so much that the largest beet seed production activity that had been undertaken has been abandoned, except to maintain a sort of little working nucleus against the possibility of some future expansion need. We are carrying forward our pure strain isolation and breeding work in the expectation that the day will come and that not long hence when our sugar industry will find it practicable and desirable to grow its own seed. They are suffering just now from depending on imported seed last year, due to the fact that large quantities of imported sugar beet seed when grown in the beet fields was found to be mixed with mangel-wurzel or stock beet seed, the roots from which do not produce sugar. One company in the Rocky Mountain district estimates its loss this year due to that fact alone at $200,000. The company having furnished the seed to the farmers, was bound to take back the whole crop at sugar beet prices. They could not use the stock beets for sugar production, and they were, accordingly, fed to the stock or wasted.

To avoid a repetition of this in 1922 we have now growing in Florida at a place where we have been doing some of our breeding work, the first one in Florida and the second one in Michigan or

Colorado—we are testing this year in the open field samples of imported sugar beet seed in the expectation that before the first of April we can distinguish between the stock beets and the sugar beets in those crops. The sugar factories will then be notified as to which lots of seeds are mixed, and can thus avoid the use of the contaminated lots.

Mr. BUCHANAN. Can we not raise sugar beet seed in this country?

Dr. TAYLOR. We can, but at a higher cost than they can be imported. We are thoroughly convinced that we will eventually grow our own sugar-beet seed. We are continuing our work to locate the strains that produce the highest yield of sugar and those resistant to leaf diseases. After a while our beet-sugar growers will find it practical and desirable to stand on their own feet in the production of beet seed. It is work that can not be deferred if we are going to be ready when the right economic condition arises. We need to be doing this work now, and it is fortunate that we are in position to carry it along.

Mr. LEE. Are you investigating the ribbon-cane situation?

Dr. TAYLOR. Oh, yes. There are some very interesting developments there in the sugar-cane end of the field. A variety of cane yielding good tonnage and good quality of sirup, such as is produced commercially in Georgia and Florida on an increasingly large scale. Upon investigation it has been found to be the most completely immune to the Mosaic disease, which is a pest that got in from somewhere prior to the war. The "Cayana 10," a cane which the department got from Bahia, Brazil, is proving resistant to the disease and satisfactory in every respect for sirup production.

Mr. LEE. I notice a remarkable improvement in the keeping of sirup.

Dr. TAYLOR. The methods of production have been developed by the Bureau of Chemistry and it should make possible, as they are put into effect through cooperative milling or other larger unit production, a more uniform keeping quality of sirup.

FOR INVESTIGATION, ETC., OF WILD PLANTS AND GRAZING LANDS, ETC.

The next item on page 63, for investigation, improvement, and utilization of wild plants and grazing lands, and for determining the distribution of weeds and means of their control is a paragraph which covers the economic botany work of the bureau, as well as the closer study of the life history of those plants which have become or threaten to become troublesome weeds. The blueberry improvement work is developing some very interesting and promising results from the standpoint of variety improvement, methods of tillage, etc. There is not any change in authority or amount of this appropriation.

INVESTIGATION AND IMPROVEMENT OF METHODS OF CROP PRODUCTION UNDER DRY LAND CONDITIONS.

On page 64 is the item for the investigation and improvement of methods of crop production under subhumid, semiarid, or dry land conditions. This subappropriation is the one under which the dry farming investigational work of the department is conducted. The field stations are located entirely in the Great Plains area, reaching from the Canadian to practically the Mexican border, and starting roughly at the ninety-eighth meridian of longitude and extending westward to the foot of the Rockies, at the 5,000-foot contour.

These are cooperative with the States in which the field stations are located, in a large proportion of cases. The dry-farming work of the States of that region hooks into this so that there is a single purpose line of experimentation under way from North to South down that whole area. It is devoted primarily to the testing of tillage methods, testing of rotation crops; and more recently in cooperation with the Bureau of Animal Industry at certain places, live-stock work looking toward the profitable utilization of such crops as prove safe to plant and are fairly sure to produce. We ask this year $6,000 additional to the current appropriation to cover certain upkeep items, including repairs to buildings and replacement of equipment, which have not been possible during the past several years and which are necessary. We also ask as an insurance against the possibilty of destruction by fire or storm that there be inserted in this subappropriation a proviso that will remove this subappropriation from the limitation in this act as to the cost of a farm building which in the Bureau of Plant Industry is set at $1,500 for any single building.

Mr. **Anderson**. You do not have in contemplation now the construction of any buildings, do you?

Dr. **Taylor**. No, sir.

Mr. **Anderson**. The increase now in the bill is intended to cover repairs only,

Dr. **Taylor**. Yes, sir. We have this situation that we have nine independent stations, scattered throughout that great area. On these field stations the buildings were erected by the department. So far we have escaped entirely loss of buildings by fire and storm. There is, however, a certain element of hazard there which any business operator would have to take into account and which we feel it is prudent to take into account, as a considerable number of buildings on these farms could not be replaced inside the $1,500 limit.

Mr. **Anderson**. Can you state now the location of the stations and the allocation of funds to each one?

Dr. **Taylor**. I could do that in a memorandum; I could not do that off hand.

Mr. **Anderson**. I wish you would put in a memorandum on that.

Dr. **Taylor**. The statement is as follows:

Operating expenses, fiscal year 1922, at dry-farming field stations upon which buildings have been erected by Department of Agriculture:

Akron, Colo	$8,000
Ardmore, S. Dak	18,000
Big Springs, Tex	7,000
Dalhart, Tex	9,000
Garden City, Kans	2,500
Lawton, Okla	9,000
Mandan, N. Dak	39,000
Sheridan, Wyo	9,000
Tucumcari, N. Mex	6,500
Woodward, Okla	12,500
Total	$120,500

Operating expenses, fiscal year 1922, at dry-farming field stations where buildings are not owned by Department of Agriculture:		
Archer, Wyo	$2,200	
Belle Fourche (Newell), S. Dak	3,000	
Colby, Kans	2,300	
Dickinson, N. Dak	2,700	
Edgeley, N. Dak	2,200	
Havre, Mont	4,000	
Hays, Kans	3,500	
Hettinger, N. Dak	2,200	
Huntley, Mont	4,000	
Moccasin, Mont	2,500	
North Platte, Nebr	3,000	
Scottsbluff (Mitchell), Nebr	2,300	
	33,900	
Administrative (Washington office)	14,600	
		$48,500
Total appropriation, 1922		169,000

FOR INVESTIGATIONS IN CONNECTION WITH WESTERN IRRIGATION, ETC.

Mr. ANDERSON. We will take up the item on page 66 for investigations in connection with western irrigation agriculture, the utilization of lands reclaimed under the reclamation act, and other areas in the arid and semiarid regions.

Dr. TAYLOR. The item on page 66 is the item under which the research work in irrigation agriculture on Government reclamation projects is done. This, as you will recall, last year carried a proviso that $11,000 should be immediately available.

Mr. ANDERSON. That was to let you catch up?

Dr. TAYLOR. That was to let us catch up. Something happened to this item a couple of years ago, in which there was a reduction of this item for investigational work, and it became necessary for us to suspend operation of three of the field stations then in operation. At the last session Congress reconsidered the matter and made an appropriation to continue that work. Meanwhile the State of Oregon spent all of the State appropriation during the year when we had none, and tided through the field station at Umatilla in that State. In the other case we were able to maintain the permanent collections and rotations by holding a caretaker on the station on the Newlands project in Nevada, and the station at San Antonio, Tex., where the station is located on land owned by the city of San Antonio, and the maintenance is by the department.

Mr. ANDERSON. Has anything been added to this work in the last year or two?

Dr. TAYLOR. There was added in 1917 $5,000. In 1921 the appropriation of $73,580 was cut to $52,380. Last year this was brought back to $94,420, to cover the 15-months period that was involved, including this $11,000 of immediately available funds.

Mr. **Anderson.** I do not recall that appropriation. I remember the House put it in at $70,000 and it was increased in the Senate. I do not remember just what the basis of that increase was.

Mr. **Wason.** I do not know that the doctor has explained why he should have $94,000 for 1923 as compared with $73,000 in 1920.

Dr. **Taylor.** That in general represents the increase in the cost of full and normal operation of these stations which during the war period up to and including the fiscal year 1920 had been greatly slowed down, due to inadequacy of the appropriation to carry on the work. We still are up against the increased cost of operation which developed during the period from 1917 through, and which compelled restriction of the work at the stations entirely below what was productive and advisable, so that what is represented here in the increase of $73,000 to $94,000 is to cure a harmful restriction that automatically resulted.

Mr. **Wason.** Yes; but as I look at the appropriation—I do not question your statement. In 1916 you had $70,380 and in 1920 you had $73,580, which you say was a substantial cut. Yet in 1921 you had expanded by 100 other employees, and in 1922 with $94,000 you had less employees and estimated the same number of employees for 1923, and still you are asking for $94,420 for this year. Assuming that the increase from $52,380 to $94,420 was to recoup during the high prices just after the war, I do not see why you should need $94,000.

Dr. **Taylor.** Well, that is just the effect of this situation. A stationary appropriation during the period beginning with the fiscal year 1917 and becoming acute in the fiscal year 1918 when the effect of the rising costs in material became available meant a steady diminution of the volume of work that could be undertaken with a fixed total and a rising scale of costs, whether it was labor or implements or stock or whatever. No other result was possible than a diminishing scale of operation, and that is what actually occurred then. Then in the fiscal year 1921 there occurred the horizontal drop of $20,000, and it is that feature which involves and explains the need for the increase now. In other words, we are asking you to restore the dollar substantially to the prewar normal, in so far as this subappropriation is concerned, in order that we may maintain at these field stations substantially the volume, quantity, and character of the work that we were able to develop before the rising of costs came.

Mr. **Wason.** Bearing upon that incidentally, when your notes come to you will you put into the record the number of persons you had employed in the year 1917 and compare them with the number that you indicate here for 1921 and 1922?

Dr. **Taylor.** Yes, sir; and with your permission I would like to include there also the wage rate that we had to pay in order to get men at all during that period. Those actually increased from 50 to in many cases 75 or 80 per cent, just in competition with the local wage scales around us.

Western irrigation agriculture.

	1917	1922
Field station superintendents:		
$1,500 per annum (additional amount contributed by State)	......	1
$1,620 per annum	1	......
$1,900 per annum	2	1
$2,000 per annum	2	......
$2,040 per annum	1	1
$2,340 per annum	1	......
$2,400 per annum	......	1
$2,460 per annum	......	2
$2,500 per annum	......	1
Total field station superintendents	7	7
Assistant farm superintendents:		
$1,200 per annum	2	......
$1,440 per annum	2	......
$1,560 per annum	......	1
$1,620 per annum	......	1
$1,800 per annum	......	1
Total assistant farm superintendents	4	3
Unskilled laborers and teamsters:		
$45 per month	1	1
$50 per month	1	......
$55 per month	5	4
$60 per month	15	9
$65 per month	2	2
$70 per month	3	2
$75 per month	4	5
$80 per month	......	4
$85 per month	3	5
$90 per month	......	1
Unskilled laborers and teamsters—Continued.		
$100 per month	......	1
$115 per month	......	1
Total unskilled laborers and teamsters	34	35
Field station clerks:		
$25 per month	......	1
$1,020 per annum	1	......
$1,200 per annum	......	1
$1,560 per annum	......	1
$1,600 per annum	......	1
Total field station clerks	1	4
Mess cooks:		
$20 per month	1	......
$25 per month	3	......
$30 per month	2	1
$35 per month	......	2
$40 per month	......	2
$45 per month	......	1
Total mess cooks	6	6
RECAPITULATION.		
Total field station superintendents	7	7
Total assistant farm superintendents	4	3
Total unskilled laborers and teamsters	34	35
Total field station clerks	1	4
Total mess cooks	6	6
Grand total	52	55

WEDNESDAY, FEBRUARY 1, 1922.

DETERMINATION OF THE ADAPTABILITY TO DIFFERENT SOILS AND CLIMATIC CONDITIONS OF PECANS AND OTHER NUTS.

Mr. ANDERSON. Dr. Taylor, you may proceed.

Dr. TAYLOR. The next item is on page 67, covering "the investigation, improvement, encouragement, and determination of the adaptability to different soils and climatic conditions" of the various species of nuts. Nut culture in America is an infant industry, except on the Pacific coast, where the walnut and almond have been commercially established for some time. There are decided possibilities for the culture of several species of nuts in other parts of the country. The work is proceeding under a systematic plan on a moderate scale and no increase is recommended.

Mr. ANDERSON. Is there any considerable increase in the commercial plantings of these nuts?

Dr. TAYLOR. There is of the pecan. The earlier planted commercial orchards of that nut are now coming well into bearing. There are single enterprises—one, at least, in the State of Georgia, which this year produced in the neighborhood of 400,000 pounds of pecans suitable for sale. There are numerous problems that are involved, in that the pecan has been so newly introduced to cultivation.

Mr. ANDERSON. The pecan is normally a wild tree, is it not?

Dr. TAYLOR. Yes; the pecan is an American species exclusively, occurring chiefly in our Southern States, but lapping over into Mexico slightly. As a commercially planted and cared for tree, it does not date back more than about 25 years, although the pioneer work in that respect dates back as much as 75 or 100 years. It is now commercially important in the States of South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas, and considerable experimental commercial planting is being done in North Carolina, Oklahoma, and Arkansas, and also some in Tennessee. Kentucky, and Indiana. It is essentially a species which is at home in the cotton belt, and we regard its horticultural development as a matter of large potential importance for the future.

Mr. **Lee.** They thrive in Indiana, do they not?

Dr. **Taylor.** Varieties of pecan of northern origin are doing excellently in the river bottoms along the Wabash and Ohio Rivers, and the Green River, in Kentucky, but the extreme southern varieties do not thrive much above the cotton belt.

Mr. **Lee.** That is the paper-shell variety?

Dr. **Taylor.** Yes, sir. The species is native as far up the Mississippi River as Davenport, Iowa, and as far up the Wabash as the vicinity of Terre Haute, Ind. Trees from those northern sources endure apparently without injury the winters of the country as far north as Connecticut, New York, and southern Michigan.

Mr. **Lee.** Will they grow wherever the hickory nut is grown?

Dr. **Taylor.** No, sir; they are not so hardy as the shag-bark hickory, which is native as far north as middle New England, where temperatures of 20° or even 30° below zero are rather common.

Mr. **Lee.** Have you data showing the acreage of each State in pecans?

Dr. **Taylor.** I have not; but we could approximate the acreage from figures we have at the department. (See statement below:)

Statistics of pecan production in the United States, census of 1920.

State.	Trees bearing and not bearing, 1919.	Production in pounds, 1919.	Value in dollars, 1919.
Alabama	434,097	1,179,735	$353,924
Arizona	1,552	1,103	330
Arkansas	46,093	348,382	87,106
California	6,714	14,125	4,241
Florida	322,160	1,025,673	307,705
Georgia	1,099,003	2,544,377	890,535
Illinois	31,313	182,347	45,592
Indiana	6,345	18,440	5,532
Iowa	840	235	71
Kansas	37,633	252,801	75,841
Kentucky	9,848	50,352	15,110
Louisiana	195,798	2,242,859	672,862
Maryland	932	1,502	444
Mississippi	384,158	1,559,245	389,823
Missouri	117,325	555,184	166,561
New Jersey	100	10	3
New Mexico	246	626	189
New York	109	191	57
North Carolina	54,697	145,753	43,736
Ohio	279	417	126
Oklahoma	509,130	4,296,642	859,331
Oregon	179	352	106
Pennsylvania	104	111	34
South Carolina	148,050	525,783	157,734
Tennessee	11,129	70,594	17,654
Texas	1,495,158	16,755,421	3,686,191
Utah	26	583	175
Virginia	16,349	33,927	10,184
Total	4,929,367	31,806,771	7,791,197

The census did not determine the acreage of pecans, but computed on the basis of 20 trees per acre which is believed to be the approximate average in the cultivated districts and probably not far out of the way in the forests, the total acreage of pecans is estimated at 247,000 acres.

Mr. LEE. I know it is a wonderful industry and that it is growing very rapidly in my section of the country.

Dr. TAYLOR. In addition to the pecan, I might say that improved varieties of our native black walnut, which yield more regularly and crack more easily than the average, are being found and propagated for planting, so that there is a distinct probability that we shall ultimately see the black walnut in the status of a commercial nut-producing tree, which at the same time will yield timber of high value for special purposes.

INVESTIGATION OF METHODS OF FRUIT GROWING.

The next item is on page 68, "For the investigation and improvement of fruits, and the methods of fruit growing, harvesting, handling, and studies of the physiological and related changes of fruits during the processes of marketing and while in commercial storage."

This subappropriation shows an apparent increase of $38,500; $22,000 of that, however, represents a transfer from the Bureau of Markets, without increase, of the appropriation which has for some years been made for that bureau for that portion of the fruit handling, transportation, and storage work which they have been doing. Under the appropriation to the Bureau of Markets there has been done especially the transportation studies involving the efficiency of refrigerator cars as carriers of perishables, the question of frost protection to fruits and vegetables in transit during winter, as well as their protection against warmth in summer.

The work that the Bureau of Markets has been doing, it has been agreed, is of such a technical and research character, involving so large an element of biological research to determine how these living organisms—because that is what fruits and vegetables are, even after removal from the plant that bears them—that it can be more effectively done in the Bureau of Plant Industry. I might say in this connection that this work had its origin in the Bureau of Plant Industry in the earlier days, and that it of necessity has a very close relation to the physiological and pathological research work of the Bureau of Plant Industry. It is clear to all who are responsible for it that it can be most effectively done in intimate and close-working relationship with the research work of the Bureau of Plant Industry.

FRUIT IMPROVEMENT THROUGH BUD SELECTION.

This phase is therefore a mere transfer from bureau to bureau and not an actual increase of the total appropriation of the department. The remainder of the $38,500, which is $16,500, is for two purposes: First, $9,000 for increasing our investigation of fruit improvement through bud selection. This is a line of work which began in the Bureau of Plant Industry as the result of the observation that in numerous cases fruit trees which have been supposed to come true to the bud or graft from the original tree that the scions were cut from did not in fact reproduce the typical productiveness or quality of the product of the original tree. It has also been found that particular branches of a tree varied, some proving superior to the average and others very much inferior to the average.

Careful performance record work has been done in selected groves in an effort to locate the trees which are consistent producers of good crops of desirable fruit. The work was started with oranges, lemons, and grapefruit in southern California, and through those performance records it has been determined that there are in the groves considerable numbers of "loafer" trees, which are fairly comparable to the "boarder" cow that has been detected through the Babcock test in the dairy industry. Buds cut from the branches of trees which consistently bear good crops of good fruit are found to perpetuate those characteristics very consistently thus far. Therefore, adopting the suggestion that boarder trees be transformed by budding or grafting the productive strains into them, the California Fruit Growers' Exchange has established a bud selection division of its Fruit Growers' Supply Co. to assist the growers in securing dependable buds. A large part of the nursery and grove propagation of citrus trees in that State is now with buds from trees having satisfactory performance records. The same line of work has spread to Florida, where we have been able to do little more than to suggest and advise. It is getting well under way there. There is felt a need for a thorough test of this principle in deciduous fruit trees, where, ever since budding and grafting were developed by man, those operations have rested on the principle that the bud perpetuated the characteristics of the parent tree without deviation.

There are abundant reasons to believe, however, that there are marked exceptions to this, although, perhaps, not so much marked as in the case of citrus trees. It is of such importance that the facts should be determined experimentally as promptly as possible, so that if anything like this bud variation which is proved in citrus trees occurs in the apple, pear, peach, plum, and nut trees, methods for locating highly productive trees can be developed and the principle of careful bud selection be applied in commercial practice. Our orchard industry is becoming more intensive as pests have to be fought, as fertilizers have to be bought and applied, and as spraying costs increase, and success from the commercial standpoint requires higher and steadier productivity. We have in the bureau the man who has developed this whole work and who is the recognized leader of it, in so far as this field has been entered anywhere in the world. We need $9,000 more for that work.

STUDIES OF FRUITS IN TRANSPORTATION AND IN STORAGE.

The remainder of the $16,500, which is $7,500, is asked to adequately finance our technical studies of the physiological and related changes of fruits and vegetables under temperature and other environmental conditions to which they are subjected. We have at the Arlington Farm an excellent refrigeration laboratory, built several years ago, and now operated on a partial schedule. We have the personnel to handle it effectively, but we need this additional amount for operating expenses to keep it going somewhere near capacity, and for travel expenses.

The extent to which curing and storing processes can be developed which will make possible their more orderly marketing is a matter that it is highly important to determine. It is not always the retarding of the product, but sometimes it is the acceleration of the coloring of the product. For example, this past season, following certain experiments made during the two preceding years, the Satsuma orange growers of southern Alabama, who this year had a total crop of somewhere near 200 carloads, their largest crop thus far, have successfully applied the gassing method developed in this work to the coloring of their fruit. The ripe fruit, which, when taken from the tree, had obtained its maximum development of sugar and flavor, still remained green externally. That is a rather common phenomenon under some climatic conditions in the case of citrus fruits. They found that there was in the northern markets a gap of about six weeks between the end of the commercial movement of Valencia oranges from California and the beginning of the new crop commercial movement from Florida. The Alabama crop needed to be consumed during that period, and yet the fruit in appearance was green and unattractive, and, as a matter of fact, rather difficult to sell. By placing that fruit, as it comes from the tree, in loose orchard boxes, in gas-tight rooms built of boards, and filling those rooms with gas resulting from the incomplete combustion of gasoline or kerosene, such as comes from old-fashioned oil cook stoves, or, in extreme cases, utilizing the exhaust from the gasoline engine which runs the machinery in the packing house adjacent to the curing rooms, and subjecting the fruit to that gas for a period of from 24 to 36 hours, at the prevailing temperatures, they have an attractive normal-colored fruit which the consumer appreciates and is willing to pay for. A somewhat similar case, which is of extreme interest to the grapefruit growers, is not quite ready for extensive commercial application, although some commercial lots have been handled in that way this year. This involves the curing of the fresh picked ripe grapefruit prior to placing it in cold storage in order to retard the fruit and hold it in readiness for consumption when the glut time of the season has passed. In that case a singular, and not yet satisfactorily explained, phenomenon has been recorded.

Mr. BUCHANAN. Do you mean to say that it is a method by which grapefruit can be preserved longer than it could be preserved otherwise?

Dr. TAYLOR. Yes, sir. Grapefruit, when placed in storage at low temperatures, after a few weeks begins to show brown spots on the rind and it loses flavor, and for that reason commercial storage of grapefruit has not been successful nor has it been practiced to any extent. But it has been found that if grapefruit is picked at the normal stage of picking maturity and subjected to a warm cure for a period of a few days, cured in a room where the temperature is held up to 70° or above, with a resulting slight acceleration of coloring of the fruit, it then can be placed in low temperatures and held for months without impairment of rind appearance and without material change of flavor or palatability in any respect. Therefore we feel confident that citrus fruit growers who find themselves with their markets at times overloaded with a product which a little later is greatly desired in the market will be able to prolong the consuming season, greatly to the advantage of producer and consumer. It is a line of physiological study that is highly important to continue. Along with this we are studying the temperature endurance of varieties of such crops as potatoes where, under some conditions, some varieties stand temperatures below the freezing point without permanent injury. In other cases or under like conditions other varieties when subjected to low temperatures crystallize their liquids and rupture their tissues.

Mr. BUCHANAN. What kind of potatoes are you referring to?

Dr. TAYLOR. I am referring to the common so-called Irish potato; but we are also studying the temperature relations of the sweet potato.

Mr. BUCHANAN. You have not found any variety of sweet potato that could withstand low temperature, have you?

Dr. TAYLOR. We have not found any sweet potato that will stand freezing.

The present method of curing sweet potatoes which is becoming quite general through the Southern States, the sweet potato territory, is one of the developments of this work which has been under way on a small scale for a number of years in the Bureau of Plant Industry.

Mr. ANDERSON. That is the process of a warm temperature?

Dr. TAYLOR. Yes, sir. The sweet potato is really a tropical species and it is sensitive to cold.

Mr. BUCHANAN. That method is nothing more than the old?

Dr. TAYLOR. It is a systematized kiln curing and storage under conditions suitable for this perishable product.

Mr. BUCHANAN. As far back as I can remember on the farm we used to pile up the sweet potatoes and put some corn stalks over them with some little hay and throw dirt over them to keep them warm.

Dr. TAYLOR. The commercial curing has gone further than that. The method you describe was the method that we practiced with carrots and other rather sensitive root crops as well as with the common potatoes, but it was found that the sweet potato when freshly dug if subjected to an actual heat-curing process which brings it up to 70 or 75°——

Mr. BUCHANAN (interposing). For how long?

Dr. TAYLOR. For a period of about a week usually. Houses are built so that they can be heated with any fuel that is available, wood or coal or whatever, to bring them up through the acceleration of maturing. At the Arlington farm we hold them through until May with less than 5 per cent of shrinkage, including all the decay and frequently with less than 1 per cent. The trainload movement of cured sweet potatoes to the northern cities is developing in many parts of the South, and appears to be economically sound and thoroughly practicable.

Mr. ANDERSON. Does this process have any effect upon the freezing?

Dr. TAYLOR. I think not. The sweet potato still remains a cold-sensitive product which must be kept——

Mr. LEE (interposing). You practically take the water out of the sweet potato?

Dr. TAYLOR. Slightly; but the process involves chemical and physiological changes in the product which changes it very materially and stabilizes its physiological condition. There is a keen interest and quite a large commercial development of this method.

CARE OF GARDENS AND GROUNDS, CONSTRUCTION OF WALKS, ROADWAYS, ETC., WASHINGTON, D. C.

On page 70 is the subappropriation to cultivate and care for the gardens and grounds of the Department of Agriculture, the appropriation for which is $15,000. There is no change in that.

Mr. **Anderson**. We added a slight amount last year for additional repairs to the roads?

Dr. **Taylor**. Yes, sir. .There was an addition of about $4,000, which enabled us to about half complete the resurfacing of the drives that is necessary, in addition to the repainting of our greenhouses. This repair work became very necessary through the let up in repair during the war period.

Mr. **Anderson**. Do you expect to complete the resurfacing?

Dr. **Taylor**. We should be able to do that during this coming year if the appropriation is continued.

FOR HORTICULTURAL INVESTIGATIONS, INCLUDING STUDY OF TRUCK AND RELATED CROPS.

On page 71 is the subappropriation for horticultural investigations. This covers the entire production, research work, including breeding, cultural methods, and all phases of truck-crop production, including studies of the physiological and related changes of vegetables while in the processes of marketing comparable with those of fruits which were in the paragraph recently discussed. We ask here an increase of $5,000 for enlarging the bulb investigations which have thus far been limited practically to one point in the Puget Sound region, Bellingham, and to such work as we could do incidentally at the Arlington farm. There is reason to believe that we can grow in the eastern United States a considerable portion of the flowering bulbs that we have thus far been dependent on the Old World for. This is an important portion of the stock material required by florists both under glass and outdoors. There is always some danger of bringing in new diseases and other pests with the imported bulbs and we believe that a general recognition of the principle of living at home, so far as that is economically sound, requires some encouragement through research and educational work to get a commercial bulb production industry onto its feet here in America.

Mr. **Anderson**. You will not go very far with $5,000?

Dr. **Taylor**. This is in addition to about $7,500, I think it is, that we now have, in the same paragraph.

Mr. **Wason**. Is there any other department of the Government working along the same lines or similar lines?

Dr. **Taylor**. No, sir; neither Federal nor State. It is a feature which the State experiment stations have not attacked. The only work other than that done by the department is some that is being done, mostly in cooperation with the department, by commercial experimenters feeling their way into this field. The industry in the Old World is a highly intensive hand-labor industry to a large extent, and our men are satisfied that in many particulars American style methods can be developed which will reduce the element of hand labor in tillage, planting, and propagation so that our growers, when they know how, can compete effectively with the Dutch bulb producers of Holland and Belgium and France.

Mr. LEE. Where is that station located?

Dr. TAYLOR. At Bellingham, Wash., a few miles below the international boundary on the east shore of Puget Sound.

Mr. ANDERSON. That is the only bulb station you have?

Dr. TAYLOR. Yes, sir.

Mr. ANDERSON. You are not doing any of this work down in Maryland?

Dr. TAYLOR. No; except very incidental features.

Mr. ANDERSON. Where is this station?

Dr. TAYLOR. At Bell, on the Washington, Baltimore & Annapolis Electric Road, about halfway to Baltimore.

Mr. ANDERSON. Would it not be advantageous if the bulb business were developed down there?

Dr. TAYLOR. The soil conditions at Bell are not as favorable for bulbs as we are likely to find on the Chesapeake Peninsula—level lands that are loamy at the top and with a water-retaining subsoil 2 or 3 feet down. I may say that the middle Atlantic truck crop area is the field which our specialists have in view for the eastern phase of this work. Some phases of this are carried on in greenhouses. That work is done at the Arlington farm, and some phases of that will be done at Bell.

FOR INVESTIGATING THE METHODS OF PROPAGATING FRUIT TREES, ETC., IN COOPERATION WITH STATES AND PRIVATE NURSERIES.

On page 72 we have the subappropriation for investigating, in cooperation with the States or privately owned nurseries, methods of propagating fruit trees, ornamental and other plants, the study of stocks used in propagating such plants, and methods of growing stocks, for the purpose of providing American sources of stocks, cuttings, or other propagating materials, $20,000, for which the same amount is estimated for this year. We are now about 18 months into this project, which was appropriated first in the fiscal year 1921, as I recall. It aims at freeing our nursery industry from practically entire dependence upon the nurseries of the Old World for their budding and grafting stocks, from which all our common deciduous fruit trees are grown. Our industry grew up dependent upon imported stocks chiefly because the stocks could be had in quantity in European countries and at costs that were relatively low, not because those stocks were superior to what we can grow. In fact, there is reason to believe that we can grow many kinds of fruit and ornamental tree stocks better adapted to our climatic conditions than are those that we import. We are undertaking a systematic and scientific study of this whole question of fruit and ornamental tree stocks in an effort to develop American nursery stock production upon a substantial basis of climatic adaptation so that the root stock under a hardy apple top suitable for planting in northern Iowa or Minnesota or Maine will be hardy enough to endure the lowest temperatures that occur there.

Thousands of trees and millions of dollars have been lost in the last 25 or 30 years through the tenderness of the stocks upon which trees were propagated. That is merely one phase of this work. Another phase consists in the discovery or development of stocks that are resistant to the root-attacking insects, such as the wooly aphis of the apple, which in many parts of our eastern apple territory, including the mountainous orchard districts of western Maryland, Virginia, West Virginia, and Pennsylvania, causes heavy damage to the trees, throwing them into decline and premature death just at the time when they ought to be entering upon their period of highest production. The work is just well under way; it is a long-time proposition.

Mr. **Anderson.** Has there been any development in the industry in this country since the restrictions were put on?

Dr. **Taylor.** Yes, sir; there has been a considerable production of apple seedlings, which is the most important item. There is just at present a keen interest in commercial scale experimentation on the blight-resistant pear stock. We have as a result of some of the work done years ago by our foreign seed and plant explorer, the late Frank Meyer, who was drowned in the Yangste River three years ago, some Chinese pears which are distinctly resistant to the bacterial blight of the pear which attacks both the pear and the apple wherever it has been introduced.

While the tests of the ability of those stocks to carry the desirable varieties of pears when grafted upon them so as to form durable unions and make long-lived trees have not been under way long enough to reach a final conclusion, the indications are very promising. Some of the largest nurseries in the country are growing now commercial scale blocks of pear trees on these stocks, and are establishing in their own establishments blocks of fruit-bearing trees of these Chinese pears as a source of supply of seed of known identity and blight resistance for their future supply of seedlings. These are, of course, long-time projects, dealing with long-lived tree crops. They take 10 years as a minimum, you may almost say, to begin to produce, and they ought to continue production for 50 years, anyhow; some of them ought to be productive for a hundred years if they are sound at the root and adapted to the soil and climate where planted.

Mr. **Wason.** Has any of the old countries from which most of this stock had its origin made a similar study?

Dr. **Taylor.** Apparently not, except some very small-scale studies which are now under way in one or two of the British agricultural colleges. We have more work in this line under way now, I think, in this country than has ever been undertaken previously. The industry has just grown up through accumulated practical experience in gardens and orchards, and to quite an extent with amateurs, without any systematic scientific inquiry or effort to get back to first principles. We desire to do that.

Mr. **Wason.** In your activities along this line have you predicted your work upon a survey of what the forefathers did?

Dr. **Taylor.** To an extent, yes, sir; and also upon the existing conditions in the European countries, although the disorganized travel and other conditions of the Continent of Europe have made it difficult during the past two years. We have a collaborator now in France and Italy making a special study of the mahaleb cherry stock, which is the stock most widely used in this country for our sour types of cherries, probably not because it is the best stock, but because it behaves well in the nursery and propagates easily. We know, as a matter of fact, that on certain soils in some important cherry-growing sections it has not as long a life as the mazzard cherry stock, which, however, is more difficult to handle during the nursery period. We are locating and surviving seedling apple orchards of known history especially to find the combination of an old-style seedling apple orchard and the man who knows just how it came about and just how it has been handled, in an effort to locate especially vigorous and long-lived, cold-induring seedling trees that will reproduce those characteristics in their seedlings. In general, I may say that this line of our attack is based on the belief of our specialists that ultimately our stocks for American fruit trees are going to trace back to individual trees of superior vigor, endurance, and disease and insect resistance. If such trees will reproduce those characteristics through their seed, the way is easy after that. If they will not, then we must drop back to some line of cutting propagation of the desirable stock trees, which is quite possible but which would be somewhat more expensive. Considerable work is under way along that line.

ARLINGTON, VA., FARM AND AGRICULTURAL STATION.

FOR NECESSARY IMPROVEMENTS, MAINTENANCE, ETC.

Our next paragraph is the one for the maintenance and operation of the Arlington farm, page 73. The Arlington farm, as you know, is the out-of-doors laboratory for plant work and for several other lines of work, just across the river. The land is owned by the United States, set over by a special act of Congress to the Department of Agriculture for development, maintenance, and operation as an experimental farm.

REPLACEMENT OF CENTRAL HEATING PLANT.

We ask here an increase of $54,500, $50,000 of which is for replacing the present central heating plant of the farm by one which will be more economical to operate and which will be adequate to supply the heat and such steam power as is required. The existing plant was established first by installing three secondhand boilers nearly 20 years ago. They have been supplemented since by an additional boiler in a makeshift building. The range and magnitude of the investigational work at Arlington has steadily increased, until the point has been reached where sound business principles require the reconstruction and replacement of the heating plant. The Director of the Budget had a rather special technical survey made of the situation there when this estimate was considered. Our present danger is that we will be caught by a blizzard which would wipe out greenhouse and laboratory work that has cost many thousands of dollars to bring to its present stage, if the temperature should get below the freezing point in the greenhouses and laboratories. We are hoping to scrape through this winter without going much below zero, but if we should get temperatures such as the city had in the middle of February, 1899, there would be very heavy losses that would wipe out much of the result of years of work.

Mr. **Buchanan.** How old are the boilers you have there now?

Dr. **Taylor.** Three of the boilers were second-hand boilers when placed in the plant in 1904 and 1906.

Mr. **Buchanan.** I understood you to say that they have been replaced.

Dr. **Taylor.** No; they have been supplemented by one other.

Mr. **Buchanan.** How old are the last boilers installed?

Dr. **Taylor.** The last one was purchased about 14 years ago. I can furnish you a detailed statement of the age, capacity, and condition of the various boilers.

Mr. **Buchanan.** Do you keep these greenhouses heated by steam pipes?

Dr. **Taylor.** Yes; both the greenhouses and the laboratories. There is no animal work at the Arlington farm, but in addition to the plant work, including the physiological, horticultural, and agricultural phases, there is a laboratory for the work of the Bureau of Soils in its fertilizer work, the dye laboratory of the Bureau of Chemistry, the testing laboratory of the Bureau of Public Roads and Rural Engineering, as well as laboratory work by the Bureau of Entomology. So it is an important feature not only to the Bureau of Plant Industry, which operates the farm and is responsible for its upkeep and maintenance, but also to several of the other bureaus.

Mr. **Anderson.** Has there been any estimate of the cost of this installation?

Dr. **Taylor.** The $50,000 estimate covers 200-horsepower boilers, utilizing such of the present boilers as are worth repairing, and also the relocation and reconstruction of the building.

Mr. **Anderson.** Has there been any estimate submitted by outside people as to the cost of this installation?

Dr. **Taylor.** No. The question of the possibility of securing boilers out of Shipping Board stocks that would be suitable is under investigation, but our understanding is that if that should be found practicable the Department of Agriculture would still have to pay for the boilers.

Mr. **Anderson.** Is this work going to be done under contract or is it to be done by the bureau under its own supervision?

Dr. **Taylor.** The erection of the building would probably be best handled under contract; whether the placing of the boilers could be more advantageously handled under contract we have not yet decided. We have our own railroad siding there, on which the boilers and other materials could be delivered practically at the house.

Mr. **Anderson.** What is the cost of the building?

Dr. **Taylor.** I have not that figure here.

Mr. **Anderson.** Does this involve any new piping in the building?

Dr. **Taylor.** No. This is exclusively the boiler house and its contents.

Mr. **Anderson.** I have the impression that a year or two ago we provided a new building for the Bureau of Public Roads, and which, I think, has not been constructed.

Dr. **Taylor.** I think that is the case.

Mr. **Anderson**. Is it contemplated that this heating plant will be large enough to take care of that building?

Dr. **Taylor**. Yes; and that the building would be adequate to provide for reasonable growth, but not any large growth, of the laboratory facilities at the farm.

Mr. **Magee**. Are you very bad off there now?

Dr. **Taylor**. We are all right so long as nothing blows up and the thermometer outside stays above zero.

Mr. **Magee**. I suppose no one can tell when anything may blow up or where. That is true, is it not?

Dr. **Taylor**. When you have boilers 20 years old that is emphatically true.

Mr. **Magee**. A new boiler might blow up.

Dr. **Taylor**. We should hope not.

Mr. **Magee**. What I mean to say is that when you attempt to say that you can guard against accidents there is not much to it.

Dr. **Taylor**. Well, Mr. Magee, in making a comparison between a patched boiler and a new tested boiler there is room for argument.

Mr. **Magee**. I understand about that. You have inspection there, have you not?

Dr. **Taylor**. We have departmental inspection.

Mr. **Magee**. It is competent inspection, is it not?

Dr. **Taylor**. Yes, sir; I think so.

Mr. **Magee**. If there is competent inspection and there is danger of blowing up, they would not operate the boilers, would they?

Dr. **Taylor**. No; but we would freeze up if we stop operating.

Mr. **Magee**. You mean in such weather as this?

Dr. **Taylor**. No; in this weather we are all right.

Mr. **Magee**. The colder the weather the more comfortable you are?

Dr. **Taylor**. No; the colder the weather the more danger there is of freezing up.

Mr. **Magee**. You say you would freeze up, and yet you say you are all right in this weather. I am trying to get at your idea.

Dr. **Taylor**. The idea is this: In this climate we have temperature records of 15° below zero. That has occurred twice within my recollection, in one case accompanied by a 40-mile gale of wind, which froze the water mains, the water mains in many of the streets here in the city. Under such conditions we would not be able, with our present heating plant, to maintain the temperatures in our greenhouses and laboratories above the freezing point.

Mr. **Magee**. In case of excessively cold weather pipes are likely to freeze anywhere.

Dr. **Taylor**. That is true.

Mr. **Magee**. They freeze in my city and probably in every other city.

Dr. **Taylor**. But if we freeze our greenhouses we shall be years back of where we now are.

Mr. **Anderson**. The real difficulty here is in the possibility of losing the work that has been built up through a long series of years.

Mr. **Taylor**. That is the particular jeopardy. If our department heating plant here in the city were entirely put out of commission, it would be much less expensive and disastrous to agriculture than would be the case if the temperature is materially below the freezing point in the greenhouses.

Mr. BUCHANAN. Do I understand that the capacity of your boilers for heating purposes, even though nothing blows out, is insufficient to furnish the quantity of heat necessary to preserve your plants and greenhouses in excessively cold weather?

Dr. TAYLOR. Yes, sir.

Mr. BUCHANAN. Its capacity is insufficient?

Dr. TAYLOR. Yes, sir. The activities of the farm have quite outgrown the heating plant as it stands, even if it consisted of new and sound boilers.

Mr. MAGEE. Have you had anything destroyed this winter?

Dr. TAYLOR. No, sir.

Mr. MAGEE. Was anything destroyed last winter?

Dr. TAYLOR. No, sir.

Mr. MAGEE. The year before?

Dr. TAYLOR. No, sir.

Mr. MAGEE. Or the year before that?

Dr. TAYLOR. No, sir. We have had no temperatures below zero within seven or eight years.

Mr. MAGEE. Have you ever had anything destroyed there?

Dr. TAYLOR. No, sir. When the low temperatures came we did not have the plants there.

Mr. MAGEE. So you are simply trying to safeguard against a prospective result?

Dr. TAYLOR. Yes, sir; what an actuary, I think, would decide was an inevitable future occurrence, for twice within the last 30 years we have had these destructive temperatures, but at those times we did not have these laboratories and greenhouses dependent on this heating plant.

Mr. BUCHANAN. There is another reason. You claim that the boilers you now have there are very old, two of them 20 years old.

Dr. TAYLOR. Yes; and they were secondhand in the first place.

Mr. BUCHANAN. That is about the life of a boiler, is it not; I mean, the safe life?

Dr. TAYLOR. I do not know as to that.

Mr. BUCHANAN. Have you had them examined?

Dr. TAYLOR. Yes; they are examined every year to make sure——

Mr. BUCHANAN (interposing). Tested?

Dr. TAYLOR. Yes; tested through the ordinary tests by the department engineer.

Mr. BUCHANAN. Are there any patches on them?

Dr. TAYLOR. Yes; they have had to be patched several times. Really the most satisfactory hearing on this point would be 15 minutes in that boiler house.

Dr. BALL. Col. Moseley, of the Budget Bureau, went over there, and after he saw the boilers he did not question the necessity for new ones at all. He said it was wonderful to think that we have been able to run this plant as long as we have without trouble. The boilers are old; they are patched, and the minute you force any high pressure on them you run into danger. He did not question it for a second; he said it was unquestionably the thing to do. We are now building a large new greenhouse there, and they have been building steadily, a little at a time, and there is additional equipment to be heated.

Dr. TAYLOR. The load has been increased entirely beyond the safe working capacity of the plant under anything like severe winter conditions.

Mr. MAGEE. Last year you made a request for this, did you not?

Dr. TAYLOR. No, sir; this is the first time we have made this request. We have deferred, possibly unwisely, putting this up during the period of war stress and high prices; we have deferred it to the last moment that is safe. The probability is that at least a part of the equipment can be secured from the Shipping Board; that is a matter that is being looked into both by the Bureau of the Budget and the Bureau of Plant Industry, but as we understand it, the Department of Agriculture would have to pay the Shipping Board for any articles we bought.

Dr. BALL. We would have to have an appropriation, but it would not mean the expenditure of Government money.

Mr. WASON. As I understand you, the radiating surface you are using in these buildings is in excess of the capacity of these boilers?

Dr. TAYLOR. Yes; under severe weather conditions.

Mr. WASON. It does not make any difference whether it is severe or otherwise; it is so many feet of radiating surface as compared to the capacity of the boilers. The boilers are based on the radiating surface.

Dr. TAYLOR. Yes, sir.

Mr. WASON. And that is the way a room is heated?

Dr. TAYLOR. Yes, sir.

Mr. WASON. When you install a boiler at your Arlington farm or in the building on the Mall, do you have to get any permit from the District?

Dr. TAYLOR. I think not in Government buildings.

Dr. BALL. The Arlington farm is not in the District; it is in Virginia.

Mr. WASON. But the building on the Mall is in the District?

Dr. BALL. Yes, sir.

Mr. WASON. Do you have any Government inspection?

Dr. TAYLOR. We have no inspection except that made by our own chief engineer.

Mr. WASON. That is not Government inspection.

Dr. TAYLOR. That is not steam-boiler inspection.

Mr. WASON. You are drifting along there and relying upon your engineer's judgment?

Dr. TAYLOR. We are relying upon the expert judgment of the chief engineer of the department, who has charge of the department's heating plant here on the Mall, but we operate through our own plant-industry engineer at the Arlington farm.

Mr. WASON. As I understand, these boilers have been patched several times?

Dr. TAYLOR. Two of them; yes, sir.

Mr. WASON. They are the ones about which you are complaining?

Dr. TAYLOR. There are four altogether.

Mr. WASON. But two second-hand boilers were put in?

Dr. TAYLOR. Yes, sir; three of them.

Mr. WASON. And they are the ones about which you are now complaining?

Dr. **Taylor.** Yes, sir.

Mr. **Wason.** You make no complaint about the other except as to size?

Dr. **Taylor.** That is right.

Mr. **Wason.** If this request is granted, will the 200-horsepower boilers you speak of allow you to take out these old second-hand boilers that have been there for 20 years?

Dr. **Taylor.** Yes; they will be discarded.

Mr. **Wason.** What is the capacity of those two boilers?

Dr. **Taylor.** I can not say.

Mr. **Wason.** Will you put their capacity in the record?

Dr. **Taylor.** Yes; I will furnish that information, but I have not those details here.

Mr. **Anderson.** Do you know the total capacity of the four boilers?

Dr. **Taylor.** I do not. I will furnish for the record a condensed description of the present plant, its condition and its horsepower.

Mr. **Wason.** I do not know about the other members of the committee, but the most I care about would be the capacity of each one of these second-hand boilers and the capacity of each one of the newer boilers. Your estimate calls for two boilers of 100 horsepower each?

Dr. **Taylor.** Yes, sir.

Mr. **Wason.** I wish you would include in your statement the radiating capacity you will require in this plant.

Dr. **Taylor.** As it would be with these boilers and those that are retained?

Mr. **Wason.** Yes.

Dr. **Buchanan.** Does the chief engineer who examines these boilers intimate or claim that they are unsafe?

Dr. **Taylor.** That they are uncertain.

Mr. **Buchanan.** You mean that their safety is uncertain?

Dr. **Taylor.** They are safe at low pressure. The frequency of their leakage during the past two or three years is the cause for apprehension.

Mr. **Buchanan.** Would your engineer say that it would be unsafe to carry a high pressure of steam?

Dr. **Taylor.** I think he would; I think he would have to say that.

Dr. **Ball.** Col. Moseley is an engineer, and he says it would be unsafe, and he was surprised to think that we have been able to run them that long.

Dr. **Taylor.** The statement as to the heating plant follows:

STATEMENT OF HEATING PLANT AT ARLINGTON FARM.

The present heating plant at Arlington farm consists of four 40-horsepower return tubular heating boilers. Three of these boilers were purchased in 1901 and installed to heat the range of greenhouses on the department grounds. In 1904 one of these boilers which had been damaged by being run dry was put in order and transferred to Arlington farm. In 1906, when the greenhouse plant on the Mall was torn down in order to make room for the construction of the east and west wings, two additional boilers on the department grounds were transferred to Arlington farm. The fourth boiler, a new one, was purchased about 1908, and during the past summer this boiler was retubed, and is considered to be the only one which is likely to give uninterrupted service during the present season.

The load which is carried by this plant at the present time is direct radiation, consisting of 8,730 square feet of radiation distributed over a wide area. Such radiation requires an efficient boiler capacity of at least 130 boiler horsepower to properly handle it during cold weather. While the original rating of the four boilers which we have was 160 horsepower, it is doubtful whether they would, during a very severe period, carry the load which is now upon them.

The present plant has reached the limit of its working capacity as well as its life. It is not desirable to attempt to expand the heating system in its present location. It is therefore desirable to replace the present plant by one more advantageously situated and which will handle the work required of it more effectively and with less expense for transporting fuel.

The plans and specifications of the engineers who have made the plans for the proposed equipment as well as the survey of the present situation recommend the following installation: One horizontal fire-tube heating boiler, 100 boiler horsepower; one horizontal fire-tube heating boiler, 50 boiler horsepower; one horizontal fire-tube heating boiler, 50 boiler horsepower, 125 pounds.

In other words, one high-pressure boiler. This would provide 200 horsepower capacity in lieu of the 160-horsepower capacity now available.

Estimate of cost.

1 horizontal fire-tube heating boiler, 100 boiler horsepower	$2,000
1 horizontal fire-tube heating boiler, 50 boiler horsepower	1,000
1 horizontal fire tube heating boiler, 50 boiler horsepower, 125 pounds	1,500
2 boiler feed pumps, at $350	700
Boiler settings and foundations	1,400
Breeching and stack	3,500
Pipe covering for boiler and breeching	300
2 vacuum pumps on foundations (including special valves)	1,500
1 feed-water heater on foundation	1,200
Valve fittings, etc	2,000
Miscellaneous, labor, etc	5,000
Contingencies	5,000
Total	25,100

The above estimate covers merely the actual heating equipment without shelter or stack to make it effective and to afford the proper protection. It is believed that the stack and building for proper housing of the equipment will add $25,000 to the cost of the equipment. The situation is such that by constructing the boiler house on the most advantageous site coal can be dumped directly from the cars into bunkers, and by the construction of a short tunnel all of the present distributing pipes can be tied into a new boiler house on the proposed site.

The magnitude and variety of the investigational work under way in the several laboratories and greenhouses at the Arlnigton farm constitute a very important feature of the investigational work of the whole Department of Agriculture, and as this field laboratory affords facilities for doing work which it is impossible to do in the laboratories in the city of Washington and yet is within easy reach of the city laboratories, it is one of the most valuable adjuncts to the work of the Department of Agriculture.

Mr. ANDERSON. Is there anything further on this item? If not. we will take up the next one.

Dr. TAYLOR. Just one moment. The other $4,500 of this increase is desired to meet the normal growth of the maintenance cost of the farm, as the activities there have enlarged.

Mr. BUCHANAN. How many acres are in the farm?

Dr. TAYLOR. About 400, of which nearly 100 is land reclaimed out of the marsh by filling with a hydraulic dredge.

Mr. BUCHANAN. It is good land, but very expensive land?

FOR INVESTIGATIONS IN FOREIGN SEED AND PLANT INTRODUCTION.

Dr. **Taylor.** Yes. The next paragraph is that for investigations in foreign seed and plant introduction work, which includes the maintenance of the plant detention station at Bell, Md., which was established under authority of Congress through the purchase of 50 acres of land about three or four years ago. No increase in this estimate is requested.

Mr. **Anderson.** How many plant-introduction stations have you?

Dr. **Taylor.** We have Miami and Brooksville, Fla.; Savannah, Ga.; Chico, Calif.; Bellingham, Wash.; and the detention station at Bell, Md. This work is proceeding steadily and productively. We believe it is of large importance to the future of our agriculture in all parts of the country.

The exploration phases of it, as this includes the exploration work in foreign countries, have developed some features of particular interest during the last year, especially the securing in Siam, Burma, and the eastern portions of India of seeds of the tropical trees which yield the seeds from which chaulmoogra oil is obtained. This oil the chemists and the medical men of the Public Health Service have practically demonstrated cures leprosy. Those phases, of course, are outside of our field, but we have kept in close enougn touch with them to feel certain that as the world appreciates the significance of this specific cure for leprosy, that the world demand for this oil now derived only from the seeds of these several species of wild tropical plants, will be greatly enlarged and accentuated. In cooperation with the authorities in Hawaii a 100-acre plantation of the so-called chaulmoogra trees has been established. We have in our greenhouses here, grown from the imported seeds, a considerable number of the little trees which we are placing in the Canal Zone and cooperatively with botanic gardens in the tropical South American countries and in cooperation with some of the American banana-growing enterprises on the Caribbean coast in the Central American countries.

Mr. **Anderson.** You do not expect to grow these trees in continental United States?

Dr. **Taylor.** No. Such information as we have thus far does not indicate that they will endure frost, but it does seem important to have a source of supply on the American Continent if it can be developed.

Prof. Rock, who made this expedition and who secured the seeds, which previously had been regarded as nontransportable in a living condition, is now on an expedition which is driving northward through the same area into the colder portions of the interior of southeastern Asia and getting into the southwestern interior of China, where there is reason to believe there are truly tree-sized chestnut species that may be resistant to the chestnut-blight disease that came to us from the Orient and got the better of us in our native chestnut territory. He is working under a good deal of difficulty and danger on an expedition which will require at least two years, possibly three years, to complete. That is the most important foreign exploration that we now have under way.

The subappropriation which the current act carries in the appropriation for the Bureau of Plant Industry for the purchase and distribution of valuable seeds, commonly known as the congressional seed distribution, is not included in the estimates.

PURCHASE, PROPAGATION, TESTING, AND DISTRIBUTION OF NEW AND RARE SEEDS.

Mr. ANDERSON. You have an estimate on page 75 for the purchase, propagation, testing, and distribution of new and rare seeds.

Dr. TAYLOR. The subappropriation on page 75, for the purchase, propagation, testing, and distribution of new and rare seeds, and for the investigation and improvement of grasses, alfalfa, clover, and other forage crops, etc., is the subappropriation under which we carry two separate phases of work. The first one is the distribution which the department makes, in cooperation with Senators and Representatives from rural districts of the country, of new, rare, and promising field-crop seeds. This includes in part the grasses and forage crops, such as Sudan grass, Napier grass, Giant Bermuda grass, the newer varieties of soy beans and cowpeas, the newer types of grain sorghums, and it also includes the distribution of some varieties of cotton which have been developed by the plant breeders of the bureau. This is under this appropriation that the cottonseed distribution of the department is made.

Mr. BUCHANAN. This is the appropriation for that branch of the seed distribution which covers cotton seed, soy beans, alfalfa, etc., in which you send out a few packages in the different cotton States. I do not mean the garden-seed distribution, and I have always been opposed to the garden-seed distribution.

Dr. TAYLOR. This is entirely separate from that.

Mr. BUCHANAN. The distribution I have referred to is included in this?

Dr. TAYLOR. Yes, sir; it is carried in a proviso in this item reading, "*Provided*, That of this amount not to exceed $56,600 may be used for the purchase and distribution of such new and rare seed."

Mr. BUCHANAN. I want to ask a few questions about cotton seed, from the standpoint of practical cotton production: You send out 1-quart packages of cotton seed?

Dr. TAYLOR. For initial tests.

Mr. BUCHANAN. You furnish each Congressman seven or eight hundred packages, each containing 1 quart of cotton seed. One quart of cotton seed would plant just a few rows.

Dr. TAYLOR. It is for a garden test.

Mr. BUCHANAN. As a usual thing, it is money thrown away. In those 800 packages you send out how many bushels?

Dr. TAYLOR. In a quota of 900 packages there would be about 28 bushels.

Mr. BUCHANAN. If you sent them out in 28 packages, containing 1 bushel each, that would be a sufficient quantity of seed from which to raise a bale or two of cotton. If it were properly planted by the step-drop method that quantity of seed would be sufficient for 4 or 5 acres, and if properly cultivated those 4 or 5 acres should produce 2, 3, or 4 bales of cotton. That would be enough cotton to require the ginner to clean out his gin and sweep all other seed away, thus enabling the farmer to keep his cotton seed separate and distinct, or to have practically pure seed of that particular variety of cotton. From those 3 or 4 bales he would get sufficient seed to plant his entire crop the next year, and he might be able to sell his neighbors some. As you know, the farmer, as a rule, is a hard worker, but is a failure as a business man. He plants a little seed as a matter of experiment, and if it produces well, he says that he will write to the Agricultural Department about it, but he is likely to overlook it.

Dr. TAYLOR. A good many of them do report to us.

Mr. BUCHANAN. Of course, some few of them do. I am trying to make this suggestion to your department for a practical and beneficial purpose.

Dr. TAYLOR. Let me explain a little further our plans and practice in this matter: The quart sample plan was intended to give the individual farmer merely enough for a garden test, where he could feel out the adaptability of the variety to his particular situation, with the understanding that if he is pleased with it and considers it worth while to send to us a dozen bolls for examination to determine the quality of the lint and staple, we would furnish, if he desired, the next year a sufficient supply for planting an acre. In many sections this methods has produced very useful and constructive results, but we recognize the fact that there are farmers, or a few farmers, who are prepared and desirous of making the bushel test, such as you suggest, at the start. In such cases, where we are able to locate those farmers, we are sending the seed in bushel packages. For instance, if you have in your district 20 farmers whom you feel sure would be willing to plant and would be in a position to try out, even at some risk of the variety not proving as good as those they are already planting, on that scale we will consolidate the 600 packages into twenty 1-bushel lots.

Mr. BUCHANAN. I asked if my quota could not be consolidated in that way, and they refused to do it.

Dr. TAYLOR. Was that this year?

Mr. BUCHANAN. No, sir; that was last year.

Dr. TAYLOR. We began that practice year before last, and continued it through last year.

Mr. BUCHANAN. I was raised between cotton rows, and I know something about it. I venture to say that one-half or three-fourths of the small packages that are sent to practical farmers in my district are never planted.

Dr. TAYLOR. We are in a position to cooperate with you on the basis you suggest.

Mr. BUCHANAN. I will tell you now that I will select 20 farmers in my district to whom I will ask that these seed in bushel lots be sent. I do not care anything about distributing them indiscriminately for political purposes, and I do not want to do that. I want to do some good with them if I can, and if you will consolidate my quota into bushel packages, I will have them sent to 20 good farmers.

Dr. TAYLOR. If you will send the names of the farmers we will send the seed as you direct.

Mr. LEE. I have been complaining about this method for the past two or three years.

Dr. **Taylor.** I confess that our change of practice reflects the views of a number of Members from the cotton territory.

Mr. **Lee.** If you plant only a quart of cotton seed of a particular variety, there is no possible way of ginning the cotton so as to keep those seed separate from others. I would like to have my own quota distributed in half-bushel lots if it can be done.

Dr. **Taylor.** If you will select the names, the seeds will be sent to them in half-bushel lots.

The remainder of this estimate of $135,000 is an increase of $10,000 for investigations in red-clover production, which are carried on under the investigational portion of the subappropriation. The special need for this is the fact that red clover stands and acreages have been on the decline, especially through the corn-belt States, for a number of years. Red clover is the cornerstone in the rotation practice of the corn belt as well as of a considerable portion of the Eastern States.

The causes of the decline have been theorized upon variously. There are some explanations that are applicable to particular localities, such as soil acidity, and others have been partially satisfying and have made possible some improved methods, such as liming, which in particular cases have helped materially in obtaining stands. Another suspected explanation is that which I mentioned yesterday, namely, the heavy use of imported clover seed from regions possessing a milder winter climate than ours. Such tests as have been made indicate that frequently the clover stands from such seed freeze out, and, strangely enough, the worst killing is not in the districts farthest north.

Mr. **Anderson.** Is it the supposition that snow has something to do with that?

Dr. **Taylor.** Snow certainly gives a reasonable explanation. For example, tests made from the same lots of Italian clover seed planted in Indiana and in southern Michigan, in the vicinity of Kalamazoo, and a little farther north in the vicinity of Grand Rapids, and still farther north in the upper peninsular, showed that stands from Italian seed were killed badly in Indiana and at Kalamazoo, rather badly at Grand Rapids, and were uninjured in the upper peninsula. While the temperatures in the upper peninsula usually run very much lower than down in the corn belt, it was found that the soil did not even freeze there, because the snow blanket came early and stayed until spring. Even potatoes in that soil were uninjured. In fact, it is the practice in that territory to plant potatoes in the fall. the planted tubers being rarely injured, and always under that condition they make an early strong start, frequently producing better yields than they get from spring plantings.

The tests of Italian clover seed have so frequently shown the plants to be tender as regards cold that we regard that as a very important feature. There are, however, other questions than that of imported seeds. One of these is the need of a more careful selective scientific breeding of red clover, so as to secure strains of red clover which will fit our American conditions, comparable with varieties of wheat and oats, soy beans, cowpeas, and other crops which we have found it desirable to develop in order to fit our conditions. We have now accumulated a body of observation and experience as well as personnel which we feel it is very desirable to finance for a vigorous and aggressive drive on this red-clover improvement project.

Mr. ANDERSON. Has there been any considerable reduction in the red-clover acreage in recent years?

Dr. TAYLOR. There has been an almost steady decline in clover acreage, especially in the corn belt, during the last three decades, and particularly during the decade covered by the last census and the preceding one.

Mr. ANDERSON. Do you suppose that the introduction of alfalfa has had anything to do with that result?

Dr. TAYLOR. The alfalfa acreage in the clover territory does not account for more than a small fraction of the decline in the clover acreage. Sweet clover is coming in through the same territory to supplement red clover, and, possibly, in some sections, to replace it. However, our farmers still sow red clover. They know clover, and they know what it will do when it behaves right. They do not know how to maintain soil fertility without it.

Mr. MAGEE. Is the reduction due in any degree to insect damage?

Dr. TAYLOR. There has not been much insect trouble, except in the Pacific Northwest, in the irrigated country, and that has not been so much due to insect trouble as to the nematode which I discussed yesterday. That is known to be transported with the seed in some cases, and it may possibly become spread over large areas. The trouble in the corn belt rather takes the form of a collapse of the young plants from some cause not yet known, other than its inadaptability to endure the climatic conditions after the seeds have germinated. You can get a stand in wheat and oats in the spring, and then when a little whiff of drought comes along in July or August, in such States as New York and Indiana, it apparently burns out the new stands within a few weeks. The whole question is to be attacked all along the line upon the basis of the selected development of strains that are adapted to our climatic conditions.

Mr. WASON. Do you think that the extremely high price of clover seed two or three years ago affected the harvest, as shown by the census?

Dr. TAYLOR. No, sir. The last census, which represents the acreage figures for 1919, undoubtedly did reflect an increase of grain crop acreage, such as wheat and corn, which resulted during the war period, and there was an encroachment upon meadow and pasture land, which was plowed for small grain and corn, during the year 1918 in particular, when there was a guaranty on wheat and when there was a prospective continuance of the war for another year. We have no way of determining to what extent the decrease in clover acreage last census was due to the war increase of grain acreage.

Mr. WASON. Do you sow clover seed with spring wheat?

Dr. TAYLOR. Not so much west of Minnesota. As you go into the Dakotas, particularly into North Dakota and into Montana, you will find that they do not seed much spring wheat with clover. In Minnesota it is a rather common practice, because it is a feature of their rotation.

Mr. MAGEE. You can sow clover seed in March.

Dr. TAYLOR. Yes, sir; clover seed is often sown on the snow.

Mr. **Magee.** Do you not think that clover has been to some extent superseded by alfalfa?

Dr. **Taylor.** That may be true of central New York. Alfalfa has done better in New York than almost anywhere else east of the Rocky Mountains.

Mr. **Magee.** They secure several crops during one season?

Dr. **Taylor.** There is not such an acid condition of the soil there, which is another factor that operates in alfalfa growing.

Mr. **Anderson.** I do not think you need to discuss the item for congressional seed distribution.

FOR BIOPHYSICAL INVESTIGATIONS.

Dr. **Taylor.** The department's statement in regard to that is at the foot of page 78.

The next item is for biophysical investigations, the appropriation for which is $32,500. There is no change in that. That is the same amount that was appropriated last year and is the same amount that has been provided for several years previously except in the fiscal year 1921, when it was omitted, but afterwards restored with the appropriation made immediately available, so that work could cover the full crop season of 1921.

GENERAL ADMINISTRATION EXPENSES.

The next item is for the general administrative expenses of the Bureau of Plant Industry, on page 80, and that carries the same amount as is carried for the current fiscal year, or $25,980.

This completes the general expense appropriation for the Bureau of Plant Industry.

FOR DEMONSTRATIONS ON RECLAMATION PROJECTS.

There is a miscellaneous appropriation for demonstrations on reclamation projects which is administered by the Bureau of Plant Industry, the item appearing on page 247, in which an increase of $9,000 is estimated to restore the work to its former status. This work is done entirely upon the Government reclamation projects and constitutes the agricultural advisory work for the settlers on those projects. This is something that the Reclamation Service in the development of the projects regarded as important and necessary to provide some years ago, and it has been continued by shifting our advisers from the older projects, as the settlers have found themselves in their farming operations, to the newer projects, where many of them are unused to irrigation agriculture and are just getting started. It is systematic advisory work, intended to enable the settlers to develop types of agriculture that are in line with the economic conditions of the time when the work on each project is started. It is to help them to avoid overproduction of perishables, such as potatoes and fruits, on which they have heavy freight bills in order to reach the market, and to encourage in particular the production of such crops as alfalfa and other forage crops that are suitable to convert into dairy and meat products, for which there is room in the market.

Mr. **Buchanan**. Practically, what do you do under this appropriation? Do you place a man on an irrigation project?

Dr. **Taylor**. We place a man on the Government reclamation project, and he acts as an advisor to the farmers, just as the county agent does in the older settled parts of the country under the Smith-Lever Act.

Mr. **Buchanan**. Do you have county agents in the counties where these reclamation projects are located?

Dr. **Taylor**. Generally not. In some cases, there are county agents, and in those cases it is generally a situation like this, that the county agent concentrates upon the dry-farming portion of the county, while our man handles the work upon the reclamation project.

Mr. **Buchanan**. Do you think it is advisable to put these department men in counties where they have county agents?

Dr. **Taylor**. Yes, sir. Of course, we do not maintain men on more than a very small proportion of the reclamation projects, and we always take into consideration first the question of whether the county is maintaining or should maintain a county agent who can cover both types of work. The feature which distinguishes this from other extension work that is carried on is the fact that these settlers are debters to the Federal Government under the reclamation act. and the sooner they can be placed on a self-sustaining basis, the sooner they can pay off their indebtedness.

Mr. **Buchanan**. My idea was to save the Government the expense of having two men in the same locality. Under the cooperative arrangement, a county in which a reclamation project is located should have the same treatment that other counties have, and it seems to me that it would be unnecessary for the department to have a special agent for a reclamation project.

Dr. **Taylor**. This phase of the work, I might say, was authorized by Congress at the time the Smith-Lever Act was passed, and it recognized the difference between the Government's interest in these debtors and the general public.

Mr. **Buchanan**. Those people on the reclamation projects might get all the information they needed from the county agent, and if the county agent can not give it to them, he should be instructed in the matter of their needs. It would be my idea not to station a man on a reclamation project located in a county where they have a county agent.

Mr. **Anderson**. You do not expect to station a man on every reclamation project, do you?

Dr. **Taylor**. No, sir. I think we have men at present on seven or eight of the projects. There are several projects just being settled, especially in the State of Montana, where we ought to be able to furnish men this year, and the restoration of the appropriation is desired for that purpose.

Mr. **Anderson**. In these counties, I suppose, the county agent has all the ordinary duties of a county agent, outside of the reclamation project, if there is one?

Dr. **Taylor**. Yes, sir. He has generally a radically different type of agriculture. The work on the reclamation project is intensive irrigation agriculture, and frequently such a project laps over from one county to another or even from one State into another, as in the case of the project in western Nebraska and eastern Wyoming. We line this work up through understandings with the State directors of extension so it proceeds harmoniously and without lapping the State work, expenditure, or personnel. It has produced most excellent results through developing concentrated effort upon the type of agriculture which can best be engaged in on a particular project. In many cases certain of these projects, too, it is fair to say, were exceedingly difficult agriculturally—they were sound from the engineering standpoint, but they were established without very much consideration of the agricultural feature, and settlers bought from the Government——

Mr. WASON (interposing). Is the advice that these men on the reclamation projects give to the settlers comparable with the advice that the county agent gives the dry farmer, so to speak?

Dr. TAYLOR. No, sir. Dry farming and irrigation farming are as different as corn farming and cotton farming, and while there are occasionally men experienced in both, there are not many such.

Mr. BUCHANAN. You have not a county agent hardly that could not in a little while qualify himself to give all the necessary instructions under your instruction, for both dry and irrigation farming?

Dr. TAYLOR. I wish that were true; it would simplify our work and reduce the cost of it tremendously.

Mr. BUCHANAN. That is what I want to get at.

Dr. TAYLOR. It is not the case. At the present time our irrigation agriculture is in its pioneer phase, alkali has to be dealt with, and transportation costs have to be dealt with.

WEDNESDAY, FEBRUARY 1, 1922.

FOREST SERVICE.

STATEMENTS OF COL. W. B. GREELEY, FORESTER IN CHIEF; MR. L. F. KNEIPP, ASSISTANT FORESTER IN CHARGE OF LANDS; MR. ROY HEADLEY, ASSISTANT FORESTER IN CHARGE OF OPERATIONS; MR. E. H. CLAPP, ASSISTANT FORESTER IN CHARGE OF FOREST PRODUCTS; MR. C. E. RACHFORD, ACTING ASSISTANT FORESTER IN CHARGE OF GRAZING; MR. W. R. CHAPLINE, INSPECTOR OF GRAZING; MR. E. E. CARTER, ASSISTANT FORESTER IN CHARGE OF FOREST MANAGEMENT; AND MR. H. A. SMITH, ASSISTANT FORESTER IN CHARGE OF PUBLIC RELATIONS.

Mr. ANDERSON. The committee will take up this afternoon the appropriations for the Forest Service.

AREA OF NATIONAL FORESTS—RECEIPTS FROM SALE OF TIMBER AND GRAZING FEES.

Col. GREELEY. I would like to give the committee a brief preliminary statement covering the general business situation on the national forests, which I think may be of service to the committee in considering the appropriation items.

The area of the national forests is gradually increasing, and at the end of the last fiscal year stood at 156,660,000 acres. This represents an increase during the fiscal year of practically 634,000 acres. The principal increase was an addition made by Congress to the Modoc National Forest of California, and the purchase of 193,000 acres under the Weeks Act of March 1, 1911.

Since the close of the fiscal year, an additional 140,000 acres have been purchased, or their purchase has been approved by the National Forest Reservation Commission. I point out these facts to show the committee that the size of the area under administration is rather steadily and gradually increasing, and that affects, to a limited extent, the necessary expenditures for administration.

Mr. **Wason**. Does this land brought into the reservation during the last fiscal year have any merchantable timber, in any quantity?

Col. **Greeley**. Yes, sir. There was a considerable quantity of merchantable timber on the land bought during the last fiscal year, an aggregate, I think, of approximately 300,000,000 feet, which now comes under administration.

Mr. **Wason**. What kind of timber is it?

Col. **Greeley**. The timber is characteristic of the forests of the eastern mountains. The great bulk is hardwood. In the southern Appalachian Range, with a small quantity of soft wood in the southern mountains and in New Hampshire, the great bulk is hardwood—oak, yellow poplar, etc.

The receipts from the national forests during the fiscal year including those not yet paid in, on account of the postponement of grazing fees by the authority of Congress, aggregated $4,468,000. I wish to say there, for the information of the committee, that of the delinquent grazing fees which were postponed by special legislation until December 1, last, all but 15 per cent had been paid in by December 31, and since that date additional payments have been received steadily. There is every prospect that the entire outstanding delinquency in grazing fees will be paid into the Treasury prior to the first of July. The figure $4,468,000 includes these delinquent fees, although under the special legislation part of them will be credited to the reciepts for the fiscal year 1921 and part to the year 1922, the figure represents the returns from the business done in 1921.

The receipts, on this basis, dropped below those for the preceding fiscal year by $324,542.46, or about 7 per cent. The receipts from timber, which aggregated a little less than $2,000,000, dropped 14 per cent below those of the preceding fiscal year, on account of the general depression which has affected the forest industries in practically all portions of the United States, including the forest industries in the national-forest regions. The cut of timber from the national forests, however, was maintained much more nearly at the prior level than was true of the lumber industry in the country as a whole; in other words, the use of timber from the national forests has reached a relatively stable basis, because the great bulk of this timber goes to supply existing mills and existing communities. That is indicated by the fact that the sale of timber during the fiscal year, in an amount of 1,170,000,000 board feet, was very close to the aggregate sales for the preceding year.

The average price obtained for this timber was $2.78 per thousand feet, so that the sales of timber made during the year, which will be cut during varying periods in the future, contracts running one year, two years, and some for longer periods, represent increased timber business which the service has assumed, to an aggregate of a little over $3,000,000.

Mr. **Anderson**. What is the price of stumpage this last year, as compared with previous years?

Col. **Greeley**. There is a gradual increase. The average price last year, if my recollection is correct, the average price was $2.34. The price for national forest stumpage is gradually increasing, as western timber becomes more accessible, but the average in the sales of any one year varies more or less, as determined by the quality and the accessibility of the particular sales made during that year.

There are a number of large lumber developments and paper-making developments in the national forests now pending, and which we must provide for in the provision for future work. Since the fiscal year closed, for example, a single sale of 600,000,000 feet has been made in the California Sierras, which will involve a very large operation, cutting upward of 40,000,000 feet a year. That represents the opening up, by a 60-mile railroad, of one of the inaccessible portions of the national forests.

Another sale of 900,000,000 feet is pending in California, upon the application of the California Fruit Growers' Exchange—farmers—for supplying wooden containers to some 10,000 or 12,000 of the associated fruit growers in California. This sale undoubtedly will be consummated within two or three months.

As indicating the increased demand which is reaching the national forests more and more, as the general movement of the forest industries to the West takes place, we now have a very urgent application for the appraisal and advertisement of 800,000,000 feet in central Oregon, in connection with the contemplated construction of a long stretch of railroad into new country.

We have also a pending sale of approximately 600,000,000 feet of pulp timber in Alaska, which has been under negotiation and consideration for some time, awaiting the obtaining of a power license by the applicants for this timber, in order to develop the water power necessary for a paper enterprise. Their power license has now been received, and there is every reason to indicate that this sale also will be consummated within a short period.

Mr. **Buchanan**. How much pulp do they have in Alaska?

Col. **Greeley**. Our estimate, Mr. Buchanan, which is rather rough, indicates at least 100,000,000 cords in the national forests of Alaska of material suitable for pulp.

The volume of out timber business in the future will, of course, rest upon the restoration of normal conditions in the forest industries of the country, and it is impossible to predict just how rapidly these increased demands for the use of national forest timber will materialize. If normal conditions, as they existed prior to the war, should be restored within the near future, the demand for timber from the Government forests will become very great in volume, and the service will be very hard pressed to it to keep up with the applications.

A little later I would like to indicate what some of the pending applications are in order to give the committee a concrete idea of the business situation which we will face when the lumber and paper industries get back to a normal footing.

The receipts from grazing fell off less than one-half of 1 per cent, aggregating $2,415,000, including those as yet unpaid.

Mr. ANDERSON. I did not get that figure.

Col. GREELEY. The receipts were $2,415,000. That figure includes the grazing fees which are still delinquent. The grazing use of the national forests is on a very stable basis. It now represents grazing by 38,100 western live-stock men and settlers, with an aggregate of 9,588,000 head of live stock.

Mr. ANDERSON. Perhaps I anticipate you, but I would like to ask you one question. Has there been any considerable complaint in regard to the range fees, as a result of the depression in the cattle industry?

Col. GREELEY. Yes, sir; there has been some complaint, and many requests have been received by the Forest Service and by the Secretary of Agriculture, either to remit the grazing fees altogether for the next fiscal year or to postpone the date when they are paid. Normally our grazing fees are paid in advance of the stock entering the pastures or during the first half of the fiscal year.

I would like to say, in that connection, that Secretary Wallace and those of us in the Forest Service who have been closest to this situation have studied this matter very carefully, and we do not believe that there is any sufficient need for either postponing the grazing fees or remitting them to justify the department in taking that action or to justify Congress in doing so.

Mr. LEE. Would not this be a good place to insert what the grazing fees are?

Col. GREELEY. The grazing fees at present are very moderate. The average year-long fee for cattle is $1.20. The average year-long fee for sheep is 30 cents.

Mr. BUCHANAN. Acre or head?

Col. GREELEY. Per head; and the fee for each period, summer season or spring and summer season combined, is adjusted from that year-long basis. These fees undoubtedly do not represent the full commercial value of the forage which is obtained, and that is one reason why, in my judgment, special concessions in behalf of the users of the national forest range lands are not justified. In fact, as the committee doubtless recalls, there has been much discussion in the past as to the adequacy of the grazing fees charged for the use of these national forest ranges. Since becoming Forester I have initiated a comprehensive examination and appraisal of all of our ranges, with a view to readjusting the grazing charges, not on a flat basis as at present, but as to the actual value of each district, classifying the range as to its accessibility, the quality of the forage, the availability of water, and all the factors that enter into its value to the stockman, and when this appraisal and classification are completed it is my plan to put into effect, after a very thorough discussion with the stock associations, giving them a full hearing in the matter, a new schedule of grazing fees which will probably mean a material increase in the revenue from this resource.

The way the situation has turned out this past year seems to me to indicate that no further postponement of grazing fees is necessary. Last summer a very strong request was made from many live-stock interests to postpone the grazing fees, resulting in special legislation by Congress, setting the date for the payment to December 1 last. Now, 85 per cent of our grazing users paid their fees by December 31, and the remaining balance is gradually coming in. That seems to me to indicate that the live-stock industry as a whole is prepared to carry this very moderate, very reasonable charge in a normal way, and, in my judgment, it does not warrant the Government in extending any short-term credits, as you might call them, to a very limited number of users of this resource.

The receipts from land uses during the fiscal year are the highest we have ever had, aggregating $158,296. That is the one department, or one branch, of the business in which we show an increased revenue over the preceding fiscal year, and it reflects chiefly the increased use of the national resources for summer homes and other recreational facilities.

There are enormous numbers of people coming into the national forests every summer for camping, fishing, touring, and other forms of recreation, and leasing some tracts of land for summer homes at very moderate fees, which the permittee can occupy. He can build there a lodge or a cabin, or, if he desires to, a more elaborate structure. This form of use is developing very rapidly.

This has seemed to us to be a desirable form of public service, which the national forests should render, but the tremendous increase in the use of national forests by campers and transients does add greatly to our fire hazard, and it has given us a problem in maintaining sanitary conditions at the more crowded camp grounds, which is one of the serious problems which we meet, and which we are asking Congress to provide for in this budget.

Mr. **Lee**. How much do you charge for a camper's site—for the transient?

Col. **Greeley**. There is no charge at all for transient camping.

Mr. **Lee**. I mean permanent.

Col. **Greeley**. The permanent camp sites are leased at from $5 to $25 a year, depending on the acreage.

Mr. **Lee**. Would you give them a lease for 10, 15, or 20 years?

Col. **Greeley**. Yes, sir; we have authority from Congress to give a lease for a maximum of 30 years.

RESOURCES OF NATIONAL FORESTS.

The committee is familiar, of course, with the resources of the national forests. I wish, as a general background for the Budget, to speak of two or three important factors, which I feel should be borne in mind in consideration of the provision made for protection and administration. A conservative appraisal of the value of this public property, covering only the demonstrable values of the bare land and timber, and leaving out of consideration the value of the water resources and all the intangible values that exist, but which can not readily be put in terms of dollars and cents, shows that the property to-day is worth a little more than a billion dollars. That does not, however, begin to express the real value of the national forests. They contain about 17 per cent of all the forest land in the country; and they contain 25 per cent of all the standing timber in the country, or around 565,000,000,000 feet.

In addition to the standing timber, they contain approximately 20,000,000 acres of young growth areas that have been burned, some of them many years ago; and which as a result of systematic protection, have restocked with young timber. We have in the national forests an appreciable proportion of the regrowth of the country, as well as 25 per cent of the merchantable timber of the country.

About 25 per cent of the water power resources of the United States are in the national forests. To give the committee an idea of what this forest property amounts to, as we anticipate its development, I would like to point this fact out. Under the present use of the timber in the forests, taking care of the demands that we receive, we are actually cutting each year about two-tenths of 1 per cent of the aggregate volume of timber, and this brings in a revenue of something over $2,000,000 a year. Now, the cut of timber from the national forests can be increased at least seven times and still be kept on a perpetual basis. That is, we can increase our cut at least seven times, and still be simply drawing down each year the interest on the capital, the current growth, without impairing the supply.

Mr. LEE. About what would be the percentage of that?

Col. GREELEY. Well, possibly 2 per cent a year, or between one-half of 1 per cent and 2 per cent.

If the present price received for our timber remained unchanged, we have a prospective income of nearly $14,000,000 a year from the timber in the national forests alone, when the market permits full utilization, and, of course, it is, I think, obvious that that amount will be further increased by the rising value of timber, which is gradually taking place more or less over the entire country, and which is going to be accelerated in the case of the high quality, old growth timber, which the national forests contain, but which is being very rapidly depleted elsewhere.

PROTECTION AGAINST FOREST FIRES.

The special effort which the Forest Service has made, which I have made personally during the past year, has been to make the protection of the national forests from fire more efficient, up to the limit of our resources.

A definite plan has been put into effect, and the Forester's immediate staff has put a great deal of personal emphasis and drive behind that plan, to give the forests more efficient protection. And I want to say that the main idea in that plan has been to quit talking about shortage of money, which we have been very prone to say was the reason for our bad fires, and to instill the idea in the minds of everyone that it was up to the service to make sure that it was doing absolutely the best it could with the funds that Congress had provided. That has meant sacrificing work in other respects, in order to employ more guards and fire patrols, where they are particularly needed.

There has been a good deal of effort to secure a better placing of the protecting force, and better organization, and to speed it up, so that the incipient fires could be reached and put out when they were still a one-man fire, and so as to avoid the bad conflagrations, which not only are destructive but which require emergency expenditures which run up into the hundreds of thousands of dollars. In the same way we have given a good deal of attention to improving the facilities for detection, through the construction of lookout towers, telephone lines and trails. We have made a special effort to increase the proportion of expenditures for protection. In other words, we have cut down on other activities where we could, within the limits of the authority given us, to provide for the exacting needs of protection.

During the calendar year of 1921 (and we make up our fire data by calendar years, because the end of the fiscal year comes in the middle of our fire season, we had 5,734 fires in the national forests. Seventy-six per cent of these fires were extinguished while they were still small; that is, extinguished by the regular force.

Mr. ANDERSON. Seventy-six per cent in number?

Col. GREELEY. Seventy-six per cent of the total number. The area burned was 358,000 acres, which is about two-tenths of 1 per cent of the total area of the national forests. The amount of damage done was about $520,000, which is something less than one-tenth of 1 per cent of the value of the timber in the national forests.

This protection was carried out at a cost, including all of the emergency expenditures, and the deficiency appropriation, which we again had to request of Congress, of about 16 mills per acre. Thus, based on the national forest area in the States, excluding Alaska—and the fire problem in Alaska is so small as not to justify including that area in any figures of this character—the cost of the regular protective organization, rangers, summer guards, equipment, etc., amounted to about $1,700,000, and the emergency cost, almost wholly labor, and labor subsistence, amounted to $509,000, making a total expenditure from all sources, for the protection of the national forests, $2,209,000——

Mr. ANDERSON. Does that include the deficiency expenditure?

Col. GREELEY. Yes, sir; or an average of 16 mills per acre on the national forests, excluding Alaska.

The 16 mills per acre is too low, although this year, which was a relatively favorable year, we kept the fire damage in area and dollars down to what I think would compare very well with any insurable risk, two-tenths of 1 per cent of area, and one-tenth of 1 per cent of the value.

While we are endeavoring to protect the national forests at 16 mills per acre, the States of Oregon and Washington have prescribed by statute that private timber owners and owners of other classes of forest lands must furnish adequate protection for their property within a cost limit of 5 cents per acre, and the general data obtained by the Forest Service, based on the estimates of some 30 State forestry departments, put the cost of effective protection of the forest lands of the country generally at 2½ cents per acre. Of course, with a large area such as we have we should be able to furnish protection at less than the cost to owners who cover smaller areas. At the same time we are still not properly equipped in the number of guards for the average fire season, and we are particularly unequipped for the specially severe fire season.

The average forest ranger and guard must now protect 52,000 acres. Taking our entire summer force and dividing it up over the total area which we must protect, the average is 52,000 acres per man, and under the normal climatic conditions, excluding exceptionally favorable years, that is too large a job, and as long as our protective organization is carried on that footing, we must expect that a certain proportion of the fires will get beyond control; they can not be reached in time, and consequently we will have large emergency expenditures and considerable damages to property.

Mr. ANDERSON. You would have some fires, and some fires would get away from you if you had a million fighters?

Col. GREELEY. That is possible. I do not anticipate we can ever reach the time when we can hit every fire and get it out before it reaches a size that will require additional expenditure, but I think that in handling a property like this we ought to build up to the point where we can put out at least 90 or 95 per cent of all the fires which get started before they reach a size where more than the near-by patrolmen can handle them, or the patrolmen in the immediate vicinity are required.

Mr. ANDERSON. Has that been the tendency during the last few years?

Col. GREELEY. In the main we have been crawling up on the proportion of fires that we put out while they are small, but the progress is too slow to satisfy me. I want to make sure that we are doing the best we can with our appropriation. The particular point here which concerns the committee—it is the same point I brought up last year—is the effect upon the total expenditures of leaving the service in a situation where the incurring of deficiencies is almost unavoidable.

In the 12 years from 1911 to 1922 we have had to request eight deficiency appropriations—in 8 years out of 12. They have ranged in amounts from $57,000 to a maximum of nearly $3,000,000. In the last fiscal year the deficiency was relatively small, compared to what it has been in many cases, or $341,000. Taking the past 12 years, we have had on the average to come to Congress for a deficiency appropriation of $567,000.

Mr. ANDERSON. Is there any apparent relation between the number of fires and the amount of money you have had to do business with? I mean, any relation between the amount of damage done, the amount of acreage burned, and the amount of money you have had to spend?

Col. GREELEY. The increased appropriations for the regular protective force have very clearly resulted in reducing the amount of damage and the area burned over. The number of fires is something that is more or less beyond our control, although we are trying to reach that through a process of education.

Including the emergency appropriation, which our bill has carried every year for a number of years, plus the deficiency appropriation, the average yearly expenditure for fighting fires in emergencies of the past 12 years has been $779,000, and that is the point of finance policy that I think most concerns Congress.

In other words, Congress has had to appropriate on the average $779,000 to extinguish fires after they have gotten too big for our regular organization to handle, and I am confident that a considerable portion of that money can be saved to the Government through making reasonable increases in the force of guards available, to make up our regular organized protective force.

From every standpoint the emergency expenditures are undesirable. When a fire breaks out of bounds and men have to be employed in large crews, subsistence has to be provided in large amounts, and everything done under the pressure of saving every possible moment, it is inevitable that the expenditures should be in part uneconomical. We have wasted a certain amount of that money, and I do not think it is avoidable, when you attempt to meet an emergency situation through employing large numbers of additional help, and subsisting them. Consequently, the most urgent increase in any Forest Service item in this budget is the increase of $100,000 for employees, 200 additional forest guards, to be placed in our most critical fire regions, these 200 additional men to be employed from periods of three to six months, depending upon the length of the dangerous season. With this additional number of guards we would still have an area under the protection of each summer ranger, or patrolman, which would average 48,000 acres. That area is still too large, but the increase which we have requested here will enable us to build up the regular protection force, and in some measure, I am satisfied, cut down the deficiency appropriation, and that is the specific point in Forest Service work that I am more anxious to accomplish while I am at the head of the service than any other one thing—to see the uneconomical and more or less emergency expenditures eliminated.

Mr. ANDERSON. Will you differentiate between the conditions under which you spend money of the ordinary appropriations and when you feel justified in spending on an emergency basis?

Col. GREELEY. The method is this, Mr. Chairman. In the spring of each year I personally take up with each of our district offices the allotment of the funds which are anticipated for the ensuing fiscal year for fire-protective work. We endeavor to arrive at the average needs of each national forest, taking the good seasons and the bad seasons together, trying to arrive at the average seasonal requirement, and we then allot the money available for general expenses on national forests to the various districts within, of course, the statutory limitation, for providing the number of guards which that district requires, and we divide the money between the districts as fairly as we can, in accordance with our estimate of the needs of that district.

For example, during this present year, by that method we provided for a total of 2,381 guards employed in addition to the regular ranger force. Those guards are put on duty, forest by forest, when the climatic conditions become such as to make the starting of forest fires probable.

The emergency fund, however, which has hitherto stood at $250,000, is not allotted to the field units, but is retained in Washington, and we authorize our district foresters to draw upon that fund for emergency guards, in addition to the regular organization, when the situation has become so critical on account of the prevalence of forest fires that, in their judgment, it is necessary as an emergency measure to increase the force in the field.

Mr. Anderson. That does not now wait upon the fire having actually started and gotten more or less out of control.

Col. Greeley. No, sir; thanks to the change in the language of that item which was made last year we are able to use our discretion as to the expenditure of that money, so as to get the best results, and when we see an emergency coming we can tell the conditions; the climatic conditions show a great deal as to the coming of forest fires; they are reported to us every week and show where the dangerous spots are; and when we see plainly an emergency is coming we authorize a portion of this money for additional guards.

Mr. Anderson. That money is not now used in the same way, or under the same conditions, as your regular appropriations? I notice there is no language in that so-called emergency appropriation to distinguish it from any other appropriation. It could be used without reference to any emergency condition at all, apparently, but I was wondering whether any distinction was now made.

Col. Greeley. We treat it strictly as an emergency fund. We do not permit it to be absorbed in our allotments made at the beginning of the year. We hold it as an emergency fund and only use it when an emergency exists. The greater part of that money is used for the payment of actual fire-fighting crews, which have to be employed to suppress fires which get away from the regular organization or which they can not reach in time.

Now, there is another feature of this fire-protection situation which I wish to speak of, because it appears in the Budget. Aside from building up our organization of guards, so as to reduce the needs for emergency expenditures, our most urgent need in giving the national forests better protection is some means of training our year-long rangers in the job of fire detection and fire suppression.

LOSS OF EXPERIENCED RANGERS—NEED OF TRAINED MEN FOR TECHNICAL WORK.

We have lost heavily from our experienced rangers on account of the upset conditions following the war. We lost a third of our entire ranger force, 330 men, during the fiscal year 1920, and since then while the loss has been much less, it has been sufficient to represent a serious drain upon the experience of the field force in the technique of forest protection.

The job of fire fighting, while it is an intensely practical job, does have its technical side, and we have become convinced of the absolute necessity of instilling into all of our field men the elements of effective fire detection, the use of lookouts, the use of lookout instruments, the construction of telephones, and keeping telephone lines up under difficult conditions, in all of the details of preparedness and equipment, and in the actual organization of work in fire fighting.

Because of the urgency of building up the average quality of our field organization on this fire work, the average ability of the men to deliver the results which we expect, as well as to increase the size of the force, I have felt it necessary to include in the budget a small item for the purpose of giving systematic training to our year-long rangers in fire protection work.

The next point that I wish to emphasize to the committee——

Mr. ANDERSON. Before you leave that, I notice in the statement which accompanies that item of appropriation that of the entire amount of $20,000, $19,000 is for traveling expenses. I assume that means that what you expect to do is to gather these men together at convenient points for purposes of instruction, and you expect to use your own people for instructors?

Col. GREELEY. Yes, sir; we will use our own officers with temporary camps to house the rangers. We will bring 30 to 40 men together in each district. We expect to maintain four of these camps, and bring 30 to 40 men together in each of the four districts, and give them instructions from our best qualified and more experienced people. There will be no expenditures under that item for additional salaries or for construction work.

Aside from equipping the service in these respects for more effective protective of national forests, our principal need, which has been expressed in the budget, is to build up within reasonable limits on the trained men needed for technical work, in timber administration and in the handling of the national forest rangers.

The Forest Service lost heavily in its trained experts. During the war period resignations took a large number of these men out of our organization, and on account of the increased cost of labor, the higher salaries which we have had to pay for our temporary summer force, the increased cost of equipment, subsistence, and travel, it has not been possible to replace the trained men in timber work and grazing work whom we have lost.

In 1914 the service had 229 trained foresters, either as foresters' assistants or forest examiners. In 1919 that had dropped to 102. We lost over 50 per cent of them. We have been trying to recover this lost ground in part, and at the present date have gotten back to 154, but we are still 75 men short on the trained foresters, whom we had prior to the war.

Mr. ANDERSON. When you say you are 75 short, you mean not that there were 75 men who were employed who did not come back, but you have not that many foresters that you previously employed or got from the outside?

Col. GREELEY. Yes, the present number is 75 men less than we had before the war, and in the face of the increased demand for the use of national forest timber, which requires expert work of trained men, that is a situation which I feel to be very serious.

Aside from our being short of qualified men to handle the current use of the forests, we feel this shortage very seriously in filling vacancies of responsibility in administrative offices. We have not got the men in the organization who have had practical training, coupled with a reasonable amount of experience, to show their qualities and bring out the stuff they have in them, to fill the vacancies that occur in responsible administrative positions, and that is one respect in which the service now is in a serious situation. We need to keep a good number of trained men coming up through the ranks, and acquiring experience, weeding out the inexpert, so as to have available men to fill positions at the top, and that reason, combined with the current business that we must provide for, has prompted the inclusion in the estimate of a fund for the employment of 20 additional forest assistants, representing an increased expenditure of $40,000.

The same situation exists as to our grazing work. The large problem of the Forest Service in handling its range lands is to find out where we can increase the number of stock. If we had the range available we could easily put 75 per cent more live stock on the national forests, because of the demand for the use of these range areas from the live-stock growers in the agricultural communities in the national forest regions. At the same time we are bound to maintain the productivity of the ranges, and we can not, in justice to our permitees, increase the live stock indiscriminately.

We have got to adjust the number of live stock permitted to the carrying capacity of the land, so the range will not deteriorate. We have demands in some forests three times over for the use of the range from live-stock growers and settlers.

To meet that situation requires a reasonable number of men who are technically trained in grazing work. We have now 29 men of that character on our rolls, and we have lost a number there, and we need to increase the number of grazing assistants in order to place trained men on the national forests, where this particular situation is most serious, to work out the local problem of adjusting the number of stock allowed on the forest to what the range will carry without deterioration and work out all the problems of the seasons of the year during which certain areas should be grazed, how grazing capacity can be increased through developing better watering facilities, or opening up inaccessible ranges by driveways, and all that sort of thing, to the extent that we can increase the number of live stock admitted to the national forests. By such methods it will not only increase the revenue, but we will increase the service which the forests are rendering to the community, which is the most important part of it. For that reason we have included in the estimate a provision for 10 additional grazing assistants.

PERMITS FOR GRAZING.

Mr. **Anderson**. To what extent are these permits represented by permits to homesteaders and settlers, and also cattle operators?

Col. **Greeley**. I can not give you the precise division. I would say, roughly, two-thirds of the permits are issued to local ranch owners and the other third to permittees who are not local ranch owners.

Mr. **Lee**. They are given the preference?

Col. **Greeley**. Yes, sir; our grazing regulations give preference to local ranch owners, and particularly to the homesteader or settler who is going into the grazing business in a small way.

As a general proposition, the number of small permittees is increasing every year, and the larger herds are being gradually reduced, except in a few localities where the conditions as to settlement are such that the population is not increasing.

I thought it might be of assistance to the committee, Mr. Chairman, to prepare a brief summary of the various items in our budget. While these are covered in the four detailed tabulations which have been submitted in different forms, this will give the committee a bird's-eye view of the estimates for the Forest Service as a whole.

(The summary referred to is as follows:)

Purpose.	Expenditures, 1921.	Expenditures, 1922 (estimated).	Budget, estimated 1923.	Net increase.	Net decrease.	Transferred.
Protection and administration of the national forests:						
Statutory salaries	$2,263,737	$2,270,830	$599,510	....	$6,820	$1,676,060
Lump-sum salaries, wages and expenses	2,220,262	2,394,212	4,230,272	$160,000	....	1,676,060
Suppression of forest fires:						
Statutory salaries	....	....	....	....	....	....
Lump-sum salaries, wages, and expenses	250,000	250,000	250,000	....	....	....
Air patrol:						
Statutory salaries	....	....	....	....	....	....
Lump-sum salaries, wages, and expenses	39,150	50,000	....	....	50,000	....
Classification of lands, land exchange, entry surveys:						
Statutory salaries	21,500	21,500	21,500	....	....	....
Lump-sum salaries, wages, and expenses	87,000	75,000	60,000	....	15,000	....
Sanitary and protection facilities:						
Statutory salaries	....	....	....	....	....	....
Lump-sum salaries, wages, and expenses	....	....	10,000	10,000	....	....
Supplies and equipment:						
Statutory salaries	32,000	24,260	22,460	....	....	....
Lump-sum salaries, wages, and expenses	149,829	150,000	150,000	....	....	....
Investigation:						
Forest products (wood distillation, preservation, etc.)—						
Statutory salaries	57,338	62,560	56,300	....	....	....
Lump-sum salaries, wages, and expenses.	223,260	325,000	340,000	15,000	....	....
Range conditions—						
Statutory salaries	3,373	3,500	3,500	....	....	....
Lump-sum salaries, wages, and expenses.	35,000	35,000	35,000	....	....	....
Silvicultural and dendrological—						
Statutory salaries	30,621	25,440	25,440	....	....	....
Lump-sum salaries, wages, and expenses.	50,000	85,000	85,000	....	....	....
Planting:						
Statutory salaries	3,650	3,650	3,750	....	....	....
Lump-sum salaries, wages, and expenses	125,640	125,640	125,640	....	....	....
Training of forest officers, lump-sum salaries, wages, and expenses	....	....	20,000	20,000	....	....
Estimating and appraising timber and other resources:						
Timber surveys—						
Statutory salaries	1,200	....	....	....	....	....
Lump-sum salaries, wages, and expenses.	49,609	62,500	62,500	....	....	....
Range surveys, lump-sum salaries, wages, and expenses	30,391	37,500	37,500	....	....	....
Water-power reconstruction (for Federal Power Commission)—						
Statutory salaries	346	....	....	....	....	....
Lump-sum salaries, wages, and expenses.	8,856	13,150	25,150	12,000	....	....
Recording, digesting, and disseminating the results of scientific technical work:						
Statutory salaries	54,615	53,280	49,680	....	....	....
Lump-sum salaries, wages, and expenses	31,280	31,280	31,280	....	....	....
Improvements, lump-sum salaries, wages, and expenses	400,000	400,000	450,000	50,000	....	....
Total	6,168,657	6,499,302	6,694,482	267,000	71,820	....
Cooperative fire protection with States under act of Mar. 1, 1911, lump-sum salaries, wages, and expenses	125,000	400,000	400,000	....	....	....

Purpose.	Expenditures, 1921.	Expenditures, 1922 (estimated).	Budget, estimated 1923.	Net increase.	Net decrease.	Transferred.
Acquisition of lands under act Mar. 1, 1911, lump-sum salaries, wages, and expenses	$600,000	$1,000,000	$50,000	....	$950,000	....
Emergency expenditures, Olympic National Forest, lump-sum salaries, wages, and expenses	48,000	52,000	33,000	....	19,000	....
Protection of revested Oregon & California Ry. grant lands (for Interior Department), lump-sum salaries, wages, and expenses	36,512	25,000	35,000	$10,000	....	....
Total	6,978,169	7,976,302	7,212,482	277,000	1,040,820	....
Net decrease	....	....	....	763,820	....	....

RECAPITULATION.

	1921	1922	1923
Total statutory salaries	$2,468,380	$2,465,020	$782,140
Total lump sum	4,520,810	5,511,282	6,430,342

SALARIES.

TRANSFER OF EMPLOYEES TO LUMP-SUM APPROPRIATION.

Our appropriation for salaries of the Forest Service, statutory salaries, has been reduced by $1,682,880, and will represent a total of $782,140. This table will indicate how that statutory salary appropriation is distributed over the various lines of work.

The greater part of it, $599,000, will be spent in the administration and protection of the national forests, and smaller amounts are expended chiefly through the employment of clerks and draftsmen, and various other lines of work, such as the investigative work, etc.

The increases that have been asked for are very largely for the administration and improvement of the national forests. We request $160,000 for additional personnel on the national forests, which will go entirely into summer guards, forest assistants and grazing assistants.

Mr. ANDERSON. Before you leave that, of course your proportion in the Budget for this year, which involves the transfer of a large proportion of your work, in fact, all of your force in the field, except clerks, to the lump-sum rolls is a very radical departure from the present practice, and one which I think is contrary to the general opinion in the Congress. I wish you would point out, either now or later, in what respects the statutory roll hampers administration, if that is the fact, so that if there are any reasons for making this change we would like to have you say something about it.

Col. GREELEY. I will be glad to do that. I intended to take that up in a moment.

The increases that we have asked for, with the exception of the $15,000 which is requested under the item for investigations in forest products, will go entirely into either the development of resources or the better protection of the national forests. That includes the increase for additional personnel on the national forests, the $10,000 requested for sanitary and protective facilities, the public camping grounds, $20,000 requested for the training of forest officers, and $50,000 requested as an increase for improvement work. The $12,000 requested under estimating and appraising resources, which I will explain a little later, is required in connection with the development of water power resources on the forest.

The Budget as a whole represents a net decrease over our appropriation for the preceding fiscal year of $763,820.

The decrease, as the Budget has been submitted to the committee, falls chiefly in the item for the acquisition of forests under the Weeks Act. We have been able to make other decreases of much smaller amounts in the statutory salary roll, in the appropriations hitherto made for air patrol of the national forests, in the classification of lands and entry surveys, and in the emergency expenditures on the Olympic National Forest.

Giving the Budget a bird's-eye view, the high points in it are that we are cutting down very materially on the acquisition of additional forests; in fact, suspending that work altogether, and offsetting that in small part by increasing the provision for the protection and improvement of the properties which we now own.

Mr. ANDERSON. You are not going to guarantee, are you, that our New England friends, or our southeastern friends, are not going to ask us for a million dollars, just the same?

Col. GREELEY. No, sir; I will not.

Mr. WASON. You can guarantee that we will ask for it.

Col. GREELEY. I assure the committee they will have my moral support; but that summary I have given here presents the high points in the Budget as it is now before Congress.

INCREASES IN SALARIES.

Now, in reference to the salary roll to which the chairman referred: The statutory salaries, as presented in the item on page 82 of this print, represent a decrease over the statutory roll of the present fiscal year of $21,660 through dropping 27 positions of the clerical, messenger, and draftsman grades. This decrease is partially offset by recommended promotions on the statutory roll, which aggregate $14,840. Aside from the promotion which the Secretary of Agriculture has taken responsibility for, and on that I shall say nothing, this change in the statutory roll contemplates the promotion of 51 clerks, draftsmen, and surveyors—51 people who will actually be benefited by promotion after all the changes are worked out. I think the average increase will be $242 to the annual compensation of those people. These 51 cases have been very carefully sifted out from a total statutory roll of some 1,200 people as representing the most meritorious cases whose salaries will still be provided for in the statutory roll, and representing also the classes of employees in which the loss from resignation has been most serious.

Mr. BUCHANAN. You might give their former salaries. I do not mean all, but the range of their former salaries. You can let us know what you have increased them from.

Col. GREELEY. Yes, sir; I will be very glad to do that.

Mr. ANDERSON. Did we make any changes in the statutory roll last year?

Col. **Greeley.** No, sir.

Mr. **Anderson.** I thought I had same figures here showing that we had.

Col. **Greeley.** No, sir, there were no changes made in the statutory roll that year. Brfore answering your question, Mr. Buchanan, I want to point out the situation which we have tried to meet in these statutory roll increases from the business standpoint. We have not only tried to recognize the most meritorious individual cases, but we have tried to recognize the difficulty, or, rather, to provide for the difficulty which arises from an excessive turnover in certain classes of positions. For example, among our field draftsmen and surveyors we lost 44 per cent by voluntary resignation in 1920, 91 per cent in 1921, and 33 per cent in 1922. It is not possible to maintain a stable organization, and do efficient work, when you are losing people at that rate.

The national forest clerks left the Forest Service at the rate of 44 per cent in 1920, 28 per cent in 1921, and 30 per cent in 1922. Those are the clerks who we have as all-around office assistants and business helpers to the supervisor. They have to be the chief accountants of the supervisor's office. They have to be accountable for the public property, equipment, etc., charged to that national forest; they have to maintain all the personnel records and be ready in an emergency to go out and employ fire fighters, to buy equipment and supplies, and tend to incoming and outgoing freight, and all that sort of thing; they must be able to do their work effectively, and they must be experienced business assistants. They are rated as forest clerks, but their duties involve much more than ordinary clerical work, and losing from 28 to 40 per cent of those people every year means a shifting force, and obviously makes impossible to keep up the smooth and effective running of these National Forests, and we hear from it in a great many ways. A great many complaints, a great many appeals that have been put in to the forester's office, can be traced down to the constant necessity of shoving green and inexperienced people in the place of some experienced employee, who has resigned from the service.

In certain subclerical grades, particularly for mechanical work, the loss was 77 per cent in 1920, 39 per cent in 1921, and 54 per cent in 1922. Up to the present time we have lost in those grades in the first six months at the rate of 54 per cent per year. These are the particular classes of people that we have selected in making up the 51 promotions that are asked for in the new statutory roll. These positions are practically all in the field. They are not in the District of Columbia, and consequently they are the positions that will be the last to be reached by any general reclassification legislation.

In answer to Mr. Buchanan's question, the most important promotions involved in this readjustment of the statutory roll are, to cite some specific cases, one clerk now getting $1,800 that we wish to put up to $2,100, five clerks getting $1,600 and one getting $1,500 that we wish to put up to $1,800, and one getting $1,400 and three $1,200 that we want to put up to $1,500. These are the classes of clerical employees in our field work in which our losses have been excessive.

Mr. **Buchanan.** Is that the basic salary that they get, or is that the total amount they get including the bonus?

Col. **Greeley**. That is the base salary.

Mr. **Buchanan**. In other words, if a man gets $1,700 plus, his base salary is $1,500?

Col. **Greeley**. Yes, sir.

There are 13 draftsmen and surveyors, men who are expected not only to do drafting work on the preparation of maps and the completion of surveys, but who in the summer months must be qualified to go in the field and take charge of the field surveys, now getting salaries of from $1,400 to $1,600, that we want to put up to $1,800. That, again, is the base salary, and the bonus is in addition. There are also two draftsmen and surveyors whom we wish to raise from $1,400 to $1,600 and two from $1,200 to $1,500. Those are the principal classes of cases that we have endeavored to reach through this limited readjustment of the statutory roll. The work of these employees involves much more than routine clerical duties or routine drafting work. The clerks must be qualified to do all the business and accounting jobs in very busy offices, and in the case of draftsmen must be qualified to do inspection field work besides drafting work.

Mr. **Buchanan**. Do you know what the salary of these draftsmen employees is under the reclassification bill, as passed by the House?

Col. **Greeley**. The reclassification bill as passed by the House would put the salaries of these employees a little above what we are asking for. We have endeavored to keep within the reclassification rates.

Mr. **Buchanan**. That is, in the event that they did not get any bonus?

Col. **Greeley**. Yes; that is to say this, that the rates that we have asked for, plus the bonus, will keep these particular grades a little under the reclassification rates, to the best of our information of what these rates will probably be.

Mr. **Buchanan**. The reclassification bill fixes that salary of the $1,800 man at $2,300?

Col. **Greeley**. Yes, sir; approximately that.

After providing for these 51 increases there will be a net reduction in the statutory roll of $6,820. In other words, we have reduced by dropping 27 positions which we believe we can get on without, and we ask Congress to permit us to use a portion of that saving in increasing the salaries of a few people at the point where our experience from this turnover has shown that such increases are most needed in order to maintain a stable and efficient force.

Mr. **Buchanan**. You spoke about dropping the positions. Are they filled?

Col. **Greeley**. We do not intend to fill any vacancies in these positions as they occur.

Mr. **Buchanan**. How many have been vacant this year? I want to see whether we are saving anything or not.

Col. **Greeley**. All but one of these positions—lithographer's helper at $780 per annum—were filled at the beginning of the last fiscal year with the exception of such as happened at the time to be temporarily vacant while we were trying to get them filled again.

Mr. **Buchanan**. You said you had a big turnover, from 20 to 44 per cent. The question that is in my mind is probably in that turnover there are that many positions vacant all the time, as many as you are eliminating now.

Col. **Greeley.** The only position that has been continuously vacant during the year is the $780 position I have mentioned. There is a certain amount of lapsed statutory salaries every year covering the time required to fill vacancies in needed positions during which no salary is paid out, but the positions we are proposing to drop are such as inexperienced clerks and messenger boys, that we estimate we can spare in view of the additional efficiency gained by means of the increase requested for positions that are absolutely needed. The permanent saving of $6,820 that I mentioned is the difference between the aggregate amount we are now given for these 27 dropped positions and the total increases in statutory salaries that have been asked for. That is where we can make the permanent saving.

TRANSFER OF SUPERVISORS, DEPUTY SUPERVISORS, DEPUTY FOREST SUPERVISORS TO LUMP-SUM ROLL.

As the estimates have been prepared, $1,676,060 are transferred from the statutory to the lump-fund item, covering the salaries of 1,198 forest supervisors, deputy forest supervisors, and forest rangers. This does not involve any change in the amount of the appropriation, but transfers 1,198 positions from the statutory roll to the lump-sum roll.

The reasons for requesting this transfer are these: Employees in these three grades are now carried partly on the statutory roll and partly under two separate lump-sum items. In other words, we are employing a total of 1,283 men in these grades; 1,198 of them are on the statutory roll and the remaining 85 are on the two lump-sum rolls. which the act for the present year now carries, and which specifically authorizes the employment of field officers at these grades. It is, as we believe, rather illogical to carry men of identical qualifications and identical duties under the two different forms of employment, and we feel it is discriminatory as between individual employees performing the same duties to have one man on the statutory roll where his rate of compensation is absolutely fixed, and another man doing the same class of work on a lump-sum roll, and in a position where his compensation will be adjusted to the merit of his work, to the responsibilities which he assumes, and to the cost of living or other factors affecting his employment.

Furthermore, these men, these specific classes of men, are the local business managers of national forest units. They include 149 supervisors in charge of national forests, the deputies alternating with them in running the office of that forest, or work in the field, and the thousand-odd rangers. Each ranger is in charge of a district of from 80.000 to 600,000 acres. These men all have executive duties. They are all required to supervise field employees. The average district ranger has the supervision of from 10 to 35 guards during the fire periods. He has to employ and supervise crews of men constructing telephone lines, constructing rough roads, putting up ranger stations, putting up lookout towers, and other rough and ready national forest improvements of that character.

These men, these three classes of men, have direction of all the business handled locally in transactions for the use of timber, for the use of forage, and the leasing of tracts of land, for any proposition permissible under the law and regulations. Our supervisors, for example, have authority to sell, in accordance with the regulations, timber up to a certain prescribed amount, and each of them on all of the forests where that business is transacted makes a great many such sales a year. Each supervisor, as the business manager for his unit, the business representative of the Government, has charge of an income-producing business which ranges from $25,000 to $150,000.

These classes of employees must maintain constant relations with the general public as the representatives of the Government in authoritative positions. They are not clerks. They are not hired men; they are responsible managers of units of Government property. People come to them with their requests for uses and with their troubles and complaints. The forest ranger has got to represent Uncle Sam in dealing with that situation, and be prepared to represent him with tact, to render decisions promptly, to try to get people to see his point of view, and to have a thorough knowledge of what the situation requires. And furthermore these men, practically all of them, must at the same time have certain technical qualifications. They have to apply in their everyday work the science of forestry in the utilization of the national forests' timber. It is one of their duties to mark the timber for cutting, to supervise its removal, to supervise and carry out all the terms of the contract under which the timber is obtained, with a view to securing regrowth on that land, and see that it is kept in a safe condition as regards fire hazards.

In other words, they have got to be practical foresters, and a considerable majority of our supervisors, and a small but growing proportion of our rangers are men that have been trained in forestry—many have been in forestry schools—have been trained for the forest service, and are technically trained men. Many of these classes of employees must know a great deal about not only the practical end but the scientific end of handling the grazing land, because it rests with them to direct the use of the national forest ranges, to see that the ranges are properly divided as between sheep and cattle, to see that the grazing seasons are properly adjusted and that the grazing use is carried on in a way that is not going to deteriorate the range. In other words, we are asking a great deal of our field managers in these three sets of positions. They must be a combination of business manager with technical ability, and it has seemed to me to be simply consistent with the general policy which Congress has followed to put employees of these classes and responsibilities on the lump-fund roll. In the forest service our administrative positions toward the top of the organization have always been on the lump-fund roll. Our strictly scientific and technical positions have always been on the lump-fund roll, and we think it is much more consistent with the way the forest service personnel has been handled by Congress in the past to put these men in the field, who must combine administrative and technical funcitons, on the lump-fund roll rather than keeping them on the statutory roll.

Mr. Buchanan. The main reason you want them on the lump-sum roll is that you can adjust your compensation according to what you think their services are worth, is it not?

Col. Greeley. Yes, sir; in individual cases.

Mr. Buchanan. In other words if you had the lump sum you would not have to come to this committee for the promotion of those 51 employees now?

Col. **Greeley**. Not as to these rangers. We are not asking that the 51 employees be put on the lump-sum roll. We are asking for promotions for them on the statutory roll.

Mr. **Buchanan**. I say if you had a lump sum for that department, you would not have to come here to ask for their promotion.

Col. **Greeley**. Yes, sir. There are differences as to the efficiency of employees in these groups. Some men are more efficient than others and their efficiency should be recognized. There are also differences in their responsibilities. Some men have much more responsible work than others, and to retain a supervisor on a forest which has a very large volume of work and involves a revenue-producing business of $150,000 as compared with a supervisor of some forest whose volume of work and responsibility are very small, there must in any rational administration of business be an adjustment of compensation. There are often wide variations in the living conditions and costs of living under which these men must work.

We have forest supervisors and rangers all the way from Alaska to Florida, some in regions where living conditions are low and others in regions where living conditions are exceptionally high. Our situation in Alaska has been very difficult to handle because of the high cost of living up there and the difficulty of keeping competent men on those national forests under the statutory limitation. We feel that in order to recognize these differences adequately the service should be in a position to adjust the compensation of individual employees in these grades. I do not now have to come to Congress to adjust the compensation of a technical man or a scientific man or an administrator who is my associate in the Washington office; and I feel that Congress should adopt the same kind of view toward these field executives on the national forests, hold me responsible for results, and give me the opportunity to work out and settle what the compensation of Ranger Jim Jones in California should be as compared with the compensation of some other ranger in Alaska and a third ranger in Florida and a fourth ranger in New Hampshire.

Mr. **Buchanan**. That same argument would apply to any department of the Government that employs scientific men and even other men, and the result of that would be to put every class of employee on a lump-sum roll.

Col. **Greeley**. We do not ask to put our clerical men on a lump-fund roll, or our draftsmen or other men. We still retain our statutory roll of $780,000 I believe, which covers all those classes of employees whose work is more or less of a similar and routine character; but I feel that Congress itself has established the principle that where work is not routine in character, but is technical in character, that a lump-sum roll is the place for such employees rather than a statutory roll, and if I understand the policy of Congress correctly in such matters, as evidenced by many different appropriation acts, these three classes of employees I have mentioned more logically belong on the lump-sum roll than on the statutory roll.

Mr. **Buchanan**. You are correct as to the Agricultural Department, but that rule does not hold as to other departments that I have been on committees connected with. It seems to hold in this department. This is my first experience on this.

Col. **Greeley**. That at least is the basis for our request. I have stated the reasons why I present it.

Is there anything further you want on that particular point, Mr. Chairman?

Mr. **Anderson**. I suppose if this readjustment of the salary roll and lump-sum roll is made, you contemplate making some readjustments in the salaries?

Col. **Greeley**. We contemplate no immediate readjustments. We ask for no increase and such readjustments as are made will be made very gradually, case by case, as individual cases require.

BUILDINGS PURCHASED.

The next point I wish to mention, if you have no further questions, is in the paragraph on page 85, the insertion of the word "purchased," in the language of that general paragraph which defines the authority of the Secretary of Agriculture. It is necessary for the Forest Service to house a portion of our field personnel. Many of these men are required, by their official work, to be stationed at places where it is not possible for them to furnish quarters of their own, and we have, under authority of Congress and appropriations made from time to time, constructed a considerable number of ranger stations for the housing of our year-long men at points where their duties require them to live. Occasionally we have an opportunity to purchase a building. Occasionally buildings are erected, permanent or otherwise, on Government land, and the use of that building by the occupant is abandoned and occasionally the opportunity to buy land with buildings is afforded, where it would be the sensible thing to purchase an existing building rather than construct a new one; and our object in requesting the insertion of the word "purchased" in the language of that paragraph is to give us the choice of purchasing a building already existing where that is more economical than building a new structure. It will not apply to very many cases but now and then affords an opportunity for considerable saving in providing quarters for rangers that must be provided at any event.

Mr. **Buchanan**. In case you want the word "purchase" in there, it ought to be in the line above there following the word "erect" making it read, "erect and purchase buildings," because if you put it in there where you have it it would give you the word "purchase" without any authority. It ought to be there, "erect and purchase"; that is where the authority is given.

Col. **Greeley**. I think that that point is well taken, Mr. Buchanan

RECEIPTS FROM FOREST SERVICE.

Mr. **Buchanan**. Before you leave off that, let me ask you this: Taking all the receipts realized from Forest Service and all the costs from the Forest Service what is the balance?

Col. **Greeley**. The receipts of this past year reached $4,474,000; the total that we are asking for in this Budget, including all items, is $7,212,000. So there is that difference. If you consider only the——

Mr. **Buchanan** (interposing). I am just talking about the cash.

Col. **Greeley.** If you consider only the appropriations for the administration of the national forests themselves we are very close to being self-supporting.

Mr. **Buchanan.** Maybe I misunderstand you, but I understood you to say there was over $3,000,000 taken in for timber.

Col. **Greeley.** I said $3,000,000 in new business. The actual receipts during the past year from timber were about $2,000,000. On the basis of the national forest expenditures alone, leaving out investigative work and purchase of land and that sort of thing, we are very near self-supporting.

Beginning with page 87 another change is asked for which should be discussed. The general expenses in the administration of the national forests——

CONSOLIDATION OF APPROPRIATIONS FOR INDIVIDUAL NATIONAL FORESTS.

Mr. **Anderson** (interposing). Before you go on to that I want to ask you a question on this preceding item, the item on page 87, forest supervisors. That is covered in your general lump-sum appropriation, is it not?;

Col. **Greeley.** Yes, sir. The general expenses of the administration of the national forests are now carried in two lump-sum items, one of $175,000, which is given on page 87, and the second of $125,000, which is given in page 94, for additional salaries and field stations, expenses, etc. Also of 145 individual national forest items, which are here shown on pages 87 to 93, inclusive. There is another item on page 94 which carries another general expense appropriation to cover national forests created under the act of March 1, 1911. That is, national forests created out of land purchased under the Weeks law. Then in the present law nine items follow, covering overhead expenses in the eight national forest district headquarters and in the principal office of the Forest Service here in Washington.

In other words, the present law carries 157 different appropriations or subappropriations for the general administration of the national forests. This is a method of making appropriations which has become more or less fixed heretofore by the custom in the drafting of appropriation bills, but there is no sound reason for this embarrassing multiplicity of different items all providing for part of the same job. It is an arbitrary method. It entails a lot of useless bookkeeping and as far as I am able to judge it does not serve any useful purpose in affording control of expenditures either by the Secretary of Agriculture or by Congress. The best proof of that is the fact that the Treasury Department does not carry any separate record of disbursements of these appropriations. It lumps them all together under general expenses of the national forests; and if you were to ask the Treasury Department to-day for an analysis or record of expenditures on the national forests in these various districts and on the national forests under these 157 different national forest items it could not be furnished; which I think rather clearly shows that this method of making appropriations does not serve any useful fiscal purpose.

Mr. ANDERSON. After all, if you had a lump sum, what you would do would be to proceed to allot them to these different forests?

Col. GREELEY. We would allot them to national forest districts, and the district forester in each of those national forest districts would suballot to national forests under his jurisdiction.

Mr. ANDERSON. What does it matter whether you do it now or do it next July?

Col. GREELEY. Because the main reason is that the work in these national forest districts, as between forests, shifts from year to year and often shifts after the estimate has been made and submitted to Congress. We propose to substitute for this present multiplicity of appropriation items nine items covering the allotments desired to the eight field districts of the Forest Service under which our national forests are grouped for administration and the overhead expenses of the headquarters office in the District of Columbia. That is the normal way in which our estimates are made up and is the way in which, by one means or another, the allotments for expenditure can be most effectively made. The work in any national forest varies from season to season in accordance with the volume of its current timber uses and other items of business. It often happens that the consummation of a single large timber sale in a new region, where we have had no substantial volume of timber business in the past, means that we have got to increase the force of men employed on that particular forest by two or three to scale the timber cut under that contract and to supervise the operation to see that the terms of the contract are complied with. On the other hand, in some other forest, when some large timber operation may come to a close and two or three men may be released, their services are no longer necessary.

We get many demands of that character as the business shifts from point to point. However the funds are appropriated, we have got to place them where the business demands the employment of these men in current administration. So what we would like to have is a certain amount, plus a certain increase which I shall mention, appropriated under nine items as shown on pages 95 and 96 with a paragraph of legislative authority which simply puts together in one place the language now contained in the several different items covering the identical work. The paragraph on page 95 contains no new language. It simply assembles in a single paragraph the authority now contained in the different expense items.

Mr. BUCHANAN. Let me see if I understand this way of running it. The main object or purpose of accomplishing it is, for instance, you have got your forests divided out into districts?

Col. GREELEY. Yes, sir.

Mr. BUCHANAN. The 157 different appropriations do not recognize those different districts, but make appropriations direct for each forest?

Col. GREELEY. There is an appropriation for each forest plus the appropriation for the overhead expense in the district.

Mr. BUCHANAN. Take the first district, No. 1, $949,000. You could use that for any forest in that entire district?

Col. GREELEY. Yes, sir.

Mr. Buchanan. Whereas as heretofore appropriated you would have to confine the particular appropriation to the particular forest appropriated for?

Col. Greeley. Yes, sir.

Mr. Buchanan. It gives you a great deal of leeway in case there is much business in one and not much in the other. That is the real object of it, is it not?

Col. Greeley. That is the real object. The process that the Forest Service goes through in compiling the estimates and subsequently allotting funds is exactly in accordance with the plans that we now ask the committee to draft in the bill. We have, for example, 30 national forests in district No. 1. That covers all of Montana, the northern half of Idaho, and a small portion of eastern Washington. In making up the estimates for that district the district forester in charge takes up with each forest supervisor his needs for the ensuing year; the needs for protective work, for administration of timber sales, the administration of grazing, etc., and he makes up a tentative allotment sheet by national forests, adds to it the sum necessary for supervision of the district, and then sends it in to our office here, and our estimate is made up by duplicating that process in the eight field districts.

The estimate had to be presented to the Bureau of the Budget by the 1st of September. They had to be made up by the field service. The 1st of July—to come in here and be reviewed and combined and submitted to the department, and go to the Bureau of the Budget by the 1st of September. The money appropriated actually becomes available the 1st of the following July. In other words, over a year elapses between the preparation of the estimates and the availability of the appropriation, and in a business like ours where we have to keep up with the demand in this area and the demand on that area it is absolutely impossible to follow an inflexible system of appropriation by individual units, because the work on the units is not sufficiently stable. We have, therefore, urged the Bureau of the Budget, and we now urge the committee, to put the appropriation in this form which recognizes the actual situation and which at the same time, Mr. Chairman, in my judgment, recognizes the regional features of this situation to a sufficient degree.

One of the arguments for the appropriation by individual national forests was that the Members of Congress were interested in the items appropriated for the national forests in their States. I think that by carrying these appropriations by regional districts, that interest on the part of the Representatives will be met; while the appropriations will be put in a much more usable and workable form.

Mr. Lee. I see there, Col. Greeley, on page 96, that perhaps you have omitted about the best forest you have. I suppose that you are not going to administer that?

Col. Greeley. The best forest we have?

Mr. Lee. I don't see the forest in my State mentioned there.

Col. Greeley. I believe, Mr. Lee, that I stand corrected on that. I do not see Georgia in there, and it should be.

Mr. Anderson. Are there any forest supervisors and forest rangers carried under these items for the several forest districts?

Col. Greeley. The $1,676,000 which we asked to have taken off of the statutory roll is distributed through these nine items in accordance with our best judgment as to the allocation of those existing supervisors, deputy supervisors, and ranger positions. So that they are all in here; every supervisor and ranger that we employ will be employed under these nine items.

Mr. ANDERSON. Were there any ranger and supervisor positions carried under these separate forest appropriations before?

Col. GREELEY. There may have been a few rangers employed under the separate forest appropriation; most of that money is used for fire guards and field and office expenses. There were several supervisors, deputy supervisors, and rangers employed under the two lump-fund items of $175,000 and $125,000, which we also eliminate by this nine-item system.

Mr. ANDERSON. Well now if these lump sums for the specified forest districts are needed will that bring these lump sums under the general provision which requires a report of the number and salary and persons employed under these items?

Col. GREELEY. I think so, sir.

Mr. ANDERSON. I wish you would furnish the committee with a statement showing the number of persons employed under these items for the next year.

Col. GREELEY. Under the new allocation?

Mr. ANDERSON. Yes.

Col. GREELEY. Under the new allocation of the nine items?

Mr. ANDERSON. Yes; number and salary.

Col. GREELEY. Yes, sir. You will find a list of persons to be employed on page 221 of the Budget for 1923. I will also insert later on a statement giving in detail the supervisors, deputy supervisors, and rangers whose transfer to the miscellaneous roll is recommended.

Mr. ANDERSON. Now, one more question. Have these items been reallocated and do they carry any increase in amounts?

Col. GREELEY. Yes, sir. I would explain that exactly. The nine items total $4,243,422. That amount is the sum of the 157 lump sum appropriations made for 1922 plus the $1,676,060 transferred from the statutory roll, plus the actual increase of $160,000.

Mr. ANDERSON. That is the $160,000 that you refer to in the first place?

Col. GREELEY. Yes, sir.

Mr. BUCHANAN. That is the same thing on this?

Col. GREELEY. Yes, sir.

Mr. ANDERSON. That $160,000 has been allocated along through these different items, has it?

Col. GREELEY. That $160,000 has been allocated among the eight items for the eight forest districts to permit the employing of additional forest guards and additional forest assistants and additional grazing assistants.

Mr. ANDERSON. I wish that you would also furnish us a list which shows the forests included in each one of these districts separately and the amount of the appropriation now carried?

Col. GREELEY. Yes, sir. The list is as follows:

Statement showing forests in each district.

District 1:	
Absaroka National Forest, Mont.	$6,703
Beartooth National Forest, Mont.	7,597
Beaverhead National Forest, Mont. and Idaho	5,296

District 1—Continued.		
Bitterroot National Forest, Mont	$17,189	
Blackfeet National Forest, Mont	19,888	
Cabinet National Forest, Mont	16,806	
Clearwater National Forest, Idaho	38,201	
Coeur d'Alene National Forest, Idaho	53,290	
Custer National Forest, Mont. and S. Dak	5,470	
Deerlodge National Forest, Mont	19,813	
Flathead National Forest, Mont	51,826	
Gallatin National Forest, Mont	4,810	
Helena National Forest, Mont	4,012	
Jefferson National Forest, Mont	8,430	
Kaniksu National Forest, Idaho and Wash	28,000	
Kootenai National Forest, Mont	26,102	
Lewis and Clark National Forest, Mont	10,626	
Lolo National Forest, Mont	26,652	
Madison National Forest, Mont	3,930	
Missoula National Forest, Mont	15,212	
Nezperce National Forest, Idaho	25,690	
Pend Oreille National Forest, Idaho	20,074	
Selway National Forest, Idaho	47,367	
St. Joe National Forest, Idaho	32,026	
		$495,010
District 2:		
Arapaho National Forest, Colo	6,736	
Battlement National Forest, Colo	4,916	
Bighorn National Forest, Wyo	6,937	
Black Hills National Forest, S. Dak and Wyo	12,668	
Cochetopa National Forest, Colo	5,931	
Colorado National Forest, Colo	7,459	
Gunnison National Forest, Colo	5,371	
Harney National Forest, S. Dak	6,535	
Hayden National Forest, Wyo. and Colo	5,868	
Holy Cross National Forest, Colo	10,452	
Leadville National Forest, Colo	5,524	
Medicine Bow National Forest, Wyo	9,450	
Michigan National Forest, Mich	1,981	
Minnesota National Forest, Minn	2,970	
Montezuma National Forest, Colo	4,670	
Nebraska National Forest, Nebr	6,165	
Pike National Forest, Colo	13,373	
Rio Grande National Forest, Colo	7,157	
Routt National Forest, Colo	6,585	
San Isabel National Forest, Colo	3,924	
San Juan National Forest, Colo	9,257	
Shoshone National Forest, Wyo	7,381	
Superior National Forest, Minn	9,809	
Uncompahgre National Forest, Colo	6,690	
Washakie National Forest, Wyo	6,726	
White River National Forest, Colo	6,272	
		180,807
District 3:		
Apache National Forest, Ariz	9,779	
Carson National Forest, N. Mex	9,302	
Coconino National Forest, Ariz	21,673	
Coronado National Forest, Ariz. and N. Mex	11,050	
Crook National Forest, Ariz	3,735	
Datil National Forest, N. Mex	13,950	
Gila National Forest, N. Mex	10,847	
Lincoln National Forest, N. Mex	11,178	
Manzano National Forest, N. Mex	5,860	
Prescott National Forest, Ariz	6,255	
Santa Fe National Forest, N. Mex	17,040	
Sitgreaves National Forest, Ariz	8,341	
Tonto National Forest, Ariz	7,685	
Tusayan National Forest, Ariz	8,819	
		145,514

District 4:		
Ashley National Forest, Utah and Wyo	$3,865	
Boise National Forest, Idaho	5,247	
Bridger National Forest, Wyo	3,159	
Cache National Forest, Utah and Idaho	2,207	
Caribou National Forest, Idaho and Wyo	6,403	
Challis National Forest, Idaho	3,668	
Dixie and Sevier National Forest, Utah, Ariz., and Nev	3,179	
Fillmore National Forest, Utah	4,987	
Fishlake National Forest, Utah	2,320	
Humboldt National Forest, Nev	6,330	
Idaho National Forest, Idaho	33,365	
Kaibab National Forest, Ariz	2,708	
La Sal National Forest, Utah and Colo	2,754	
Lemhi National Forest, Idaho	2,490	
Manti National Forest, Utah	6,090	
Minidoka National Forest, Idaho and Utah	4,709	
Nevada National Forest, Nev	2,249	
Payette National Forest, Idaho	17,887	
Powell National Forest, Utah	1,010	
Salmon National Forest, Idaho	6,177	
Sawtooth National Foresh, Idaho	4,953	
Targhee National Forest, Idaho and Wyo	9,558	
Teton National Forest, Wyo	4,404	
Toiyabe National Forest, Nev	3,694	
Uinta National Forest, Utah	4,555	
Wasatch National Forest, Utah	5,000	
Weiser National Forest, Idaho	6,493	
Wyoming National Forest, Wyo	5,089	
		$164,550
District 5:		
Angeles National Forest, Calif	11,926	
California National Forest, Calif	15,028	
Cleveland National Forest, Calif	8,433	
Eldorado National Forest, Calif. and Nev	7,988	
Inyo National Forest, Calif. and Nev	3,076	
Klamath National Forest, Calif. and Oreg	20,249	
Lassen National Forest, Calif	14,181	
Modoc National Forest, Calif	7,388	
Mono National Forest, Calif. and Nev	1,647	
Plumas National Forest, Calif	24,203	
Santa Barbara National Forest, Calif	10,774	
Sequoia National Forest, Calif	13,744	
Shasta National Forest, Calif	17,425	
Sierra National Forest, Calif	15,750	
Stanislaus National Forest, Calif	14,697	
Tahoe National Forest, Calif. and Nev	16,337	
Trinity National Forest, Calif	19,484	
		222,330
District 6:		
Cascade National Forest, Oreg	7,835	
Chelan National Forest, Wash	12,667	
Columbia National Forest, Wash	9,758	
Colville National Forest, Wash	8,399	
Crater National Forest, Oreg. and Calif	22,688	
Deschutes National Forest, Oreg	10,175	
Fremont National Forest, Oreg	5,427	
Malheur National Forest, Oreg	6,091	
Ochoco National Forest, Oreg	6,451	
Olympic National Forest, Wash	16,598	
Oregon National Forest, Oreg	20,409	
Rainier National Forest, Wash	13,035	
Santiam National Forest, Oreg	7,852	
Siskiyou National Forest, Oreg. and Calif	16,360	
Siuslaw National Forest, Oreg	6,042	
Snoqualmie National Forest, Wash	13,566	
Umatilla National Forest, Oreg	10,627	

District 6—Continued.		
Umpqua National Forest, Oreg	$13,509	
Wallowa National Forest, Oreg	9,617	
Washington National Forest, Wash	7,642	
Wenatchee National Forest, Wash	14,075	
Whitman National Forest, Oreg	25,201	
		$264,024
District 7:		
Arkansas National Forest, Ark	15,730	
Florida National Forest, Fla	4,927	
Luquillo National Forest, Porto Rico	1,700	
Ozark National Forest, Ark	9,030	
Wichita National Forest, Okla	2,416	
Additional national forests created or to be created under section 11 of the act of Mar. 1, 1911 (36 Stat. L., p. 963), and lands under contract for purchase or for the acquisition of which condemnation proceedings have been instituted for the purposes of said act	84,750	
		118,553
District 8:		
Chugach National Forest, Alaska	7,938	
Tongass National Forest, Alaska	21,566	
		29,504
Grand total		1,620,292

Col. GREELEY. There is one other point I wish to make. The present lump-sum appropriation for the Nebraska National Forest provides for a rather curious thing—"to extend the work to the Niobrara division thereof, $5,000." The principal activity on the Nebraska National Forest is tree planting, and this item of $5,000 was inserted some years ago because of the interest of a Senator from Nebraska in having the tree planting work that was then being done on one of the divisions of the national forest extended to another division, the Niobrara division. The $5,000, in other words, covers tree planting exclusively, and in order to simplify and clarify the appropriation we have transferred that $5,000 to the planting item. The bill in one of the later items carries a specific provision for the purchase of tree seed and cones and planting of denuded lands in national forests. Since this $5,000 covered planting work exclusively and nothing else, I felt it to be more logical to incorporate it in the planting item.

That constitutes all the changes made in the reassembling of the lump-sum appropriations by the nine districts. The only increase in this restated appropriation is the $160,000 for forest guards, forest assistants, and grazing assistants.

Mr. ANDERSON. I would think there would be a good deal less objection to the reallocation of these items and their summing up in lump sums after the reclassification bill has passed. Then there would be some limitation upon salaries paid, whereas as the matter now stands there would not be any.

Col. GREELEY. Except the general limitation on the department.

Mr. ANDERSON. Yes.

Col. GREELEY. I recognize that situation, Mr. Chairman. The change I recommend provides for the transfer of the positions from the statutory roll to these lump-sum items. The point should be borne in mind, however, that these are all field positions. Just what the reclassification legislation, if it is enacted, will provide in regard to extending the reclassification to positions in the field service I do not know.

Mr. ANDERSON. Does it apply to the field now as it passed the House?

Col. GREELEY. It applies now only to the District of Columbia. In any event, the field positions are going to be late in being reached by reclassification, and in my judgment the fact that reclassification is pending for positions in the District of Columbia should not deter the committee from making this change. I can assure the committee that any increases in the salaries of these field employees will only be made very gradually as individual cases show the necessity.

The fact that the one total appropriation for the employees remains unchanged certainly is not going to change the situation materially, and our general policy is not to provide increases for the force of rangers and supervisors generally. All that we will do is to make adjustments in individual cases. For instance, when it is necessary to assign a ranger to Alaska, and his living cost is immediately doubled by the fact that he is required to work in that Territory; or when it is necessary to assign a supervisor in some inaccessible forest, at a great sacrifice to himself, and where we must be free to make just such changes as any business concern would make under such circumstances. We are perfectly willing to wait for the reclassification legislation before initiating any effort to a general readjustment of the salaries of the employees.

Mr. BUCHANAN. You have a bill here applying to these nine districts absorbing the 157 districts and having a lump sum run throughout the nine districts. I would like to vote for this district proposition, but I can not do it without voting for your lump-sum proposition the way this bill reads. I would like to support your district proposition because I think that it is a business arrangement.

Col. GREELEY. To meet your point of view on that, Mr. Buchanan, it would be necessary to take the 1,168 positions out of these nine lump-sum items and put them back on the statutory roll.

Mr. BUCHANAN. Yes. It would give you a little elasticity to control forest fires and grazing activities and give you a little elasticity so that you could use one appropriation for another forest as necessity might demand. I think that is business.

Col. GREELEY. I wish you would stretch that elasticity a little further to cover the individual cases.

Mr. BUCHANAN. No. I have seen too much of that.

Col. GREELEY. However, the information we will furnish at the chairman's request will enable the committee to readjust the bill along those lines if you wish. Of course, we would be glad to furnish you that statement if it is desirable.

Mr. BUCHANAN. So far as I am concerned, I would like to have you do that.

I would like to support your district proposition.

Col. GREELEY. I would like you, Mr. Buchanan, to put yourself in the situation of endeavoring to administer 149 business units with an average of 1,000,000 acres each, responsible for the protection of that property from fire, responsible for giving good service to the public, and of giving honest service to the Government, and asking those men not only to be good business managers, but to be good foresters and good grazing experts, and then have your hands tied absolutely as to what compensation you can give any individual. No business man would consider it for a moment.

Mr. **Buchanan**. It may be unfortunate for myself, but I have been on the subcommittee of the legislative appropriations, and I have had that sort of thing day in and day out, week in and week out, session after session, and the war came along and we were compelled to make lump-sum appropriations. We saw it abused and the House saw it abused, and if we were to bring back a lump sum in this instance the House would override us. That is my judgment.

Mr. **Wason**. I saw a little illustration of what my colleague refers to last week in the General Accounting Office which the subcommittee on independent offices had before the House. We reported a lump sum for that department and on the book af explanation (the same as you have here), was the number of employees, one after another, all itemized. A member of the Appropriations Committee, but not of that subcommittee, came in with a written amendment specifying and describing those different items down there and the House voted almost unanimously for it. We saw the way it was coming and did not put up a very stiff fight, although we voted against it. As I remember it there were less than 17 in the House that voted against the amendment.

Mr. **Buchanan**. I wish, if it will not be too much trouble, you would fix the thing so we can vote for the district proposition.

Mr. **Anderson**. If you will make a statement so as to show the number of supervisors and rangers and foresters allocated to each of these districts we will be able to fix this up to suit Mr. Buchanan if the rest of the committee want to do it.

Col. **Greeley**. Yes, sir. The statement is as follows:

Forest supervisor, deputy supervisor, and ranger positions included in each of the district items by transfer from the statutory roll.

District 1:		
2 forest supervisors, at $2,500	$5,000	
4 forest supervisors, at $2,380	9,520	
5 forest supervisors, at $2,180	10,900	
9 forest supervisors, at $1,980	17,820	
2 forest supervisors, at $1,780	3,560	
1 deputy forest supervisor	1,880	
5 deputy forest supervisors, at $1,780	8,900	
3 deputy forest supervisors, at $1,680	5,040	
5 deputy forest supervisors, at $1,580	7,900	
1 forest ranger	1,620	
2 forest rangers, at $1,520	3,040	
8 forest rangers, at $1,420	11,360	
45 forest rangers, at $1,320	59,400	
126 forest rangers, at $1,220	153,720	
		$299,660
District 2:		
3 forest supervisors, at $2,380	7,140	
10 forest supervisors, at $2,180	21,800	
12 forest supervisors, at $1,980	23,760	
1 forest supervisor	1,780	
2 deputy forest supervisors, at $1,780	3,560	
4 deputy forest supervisors, at $1,680	6,720	
1 deputy forest supervisor	1,580	
5 forest rangers, at $1,520	7,600	
16 forest rangers, at $1,420	22,720	
44 forest rangers, at $1,320	58,080	
113 forest rangers, at $1,220	137,860	
		292,600

District 3:		
2 forest supervisors, at $2,500	$5,000	
2 forest supervisors, at $2,380	4,760	
3 forest supervisors, at $2,180	6,540	
7 forest supervisors, at $1,980	13,860	
1 forest supervisor	1,780	
1 deputy forest supervisor	1,880	
3 deputy forest supervisors, at $1,780	5,340	
4 deputy forest supervisors, at $1,680	6,720	
2 deputy forest supervisors, at $1,580	3,160	
1 forest ranger	1,620	
1 forest ranger	1,520	
8 forest rangers, at $1,420	11,360	
47 forest rangers, at $1,320	62,040	
76 forest rangers, at $1,220	92,720	
		$218,300
District 4:		
2 forest supervisors, at $2,380	4,760	
9 forest supervisors, at $2,180	19,620	
15 forest supervisors, at $1,980	29,700	
1 forest supervisor	1,780	
6 deputy forest supervisors, at $1,780	10,680	
6 deputy forest supervisors, at $1,680	10,080	
1 deputy forest supervisor	1,580	
8 forest rangers, at $1,520	12,160	
20 forest rangers, at $1,420	28,400	
67 forest rangers, at $1,320	88,440	
87 forest rangers, at $1,220	106,140	
		313,340
District 5:		
2 forest supervisors, at $2,500	5,000	
2 forest supervisors, at $2,380	4,760	
8 forest supervisors, at $2,180	17,440	
4 forest supervisors, at $1,980	7,920	
1 deputy forest supervisor	1,880	
4 deputy forest supervisors, at $1,780	7,120	
4 deputy forest supervisors, at $1,680	6,720	
1 deputy forest supervisor	1,580	
1 forest ranger	1,620	
5 forest rangers, at $1,520	7,600	
12 forest rangers, at $1,420	17,040	
41 forest rangers, at $1,320	54,120	
68 forest rangers, at $1,220	82,960	
		215,760
District 6:		
1 forest supervisor	3,240	
1 forest supervisor	2,880	
2 forest supervisors, at $2,500	5,000	
2 forest supervisors, at $2,380	4,760	
7 forest supervisors, at $2,180	15,260	
10 forest supervisors, at $1,980	19,800	
1 deputy forest supervisor	1,980	
1 deputy forest supervisor	1,780	
6 deputy forest supervisors, at $1,680	10,080	
4 deputy forest supervisors, at $1,580	6,320	
4 forest rangers, at $1,620	6,480	
1 forest ranger	1,520	
14 forest rangers, at $1,420	19,880	
37 forest rangers, at $1,320	48,840	
85 forest rangers, at $1,220	103,700	
		251,520
District 7:		
1 forest supervisor	2,380	
1 forest supervisor	2,180	
3 forest supervisors, at $1,980	5,940	
1 deputy forest supervisor	1,880	
1 deputy forest supervisor	1,680	

District 7—Continued.		
1 deputy forest supervisor	$1,580	
1 forest ranger	1,520	
7 forest rangers, at $1,320	9,240	
35 forest rangers, at $1,220	42,700	
		$69,100
District 8:		
1 forest supervisor	2,180	
4 deputy forest supervisors, at $1,780	7,120	
4 forest rangers, at $1,620	6,480	
		15,780
		1,676,060

SUMMARY.

1 forest supervisor	3,240
1 forest supervisor	2,880
8 forest supervisors, at $2,500	20,000
16 forest supervisors, at $2,380	38,080
44 forest supervisors, at $2,180	95,920
60 forest supervisors, at $1,980	118,800
5 forest supervisors, at $1,780	8,900
1 deputy forest supervisor	1,980
4 deputy forest supervisors, at $1,880	7,520
25 deputy forest supervisors, at $1,780	44,500
28 deputy forest supervisors, at $1,680	47,040
15 deputy forest supervisors, at $1,580	23,700
11 forest rangers, at $1,620	17,820
23 forest rangers, at $1,520	34,960
78 forest rangers, at $1,420	110,760
288 forest rangers, at $1,320	380,160
590 forest rangers, at $1,220	719,800
	1,676,060

Mr. **Anderson**. Let me ask you just one more question. If these lump sums are carried will it still be necessary to carry this 10 per cent transfer provision?

Col. **Greeley**. That should be retained because of the situation to which I referred. The shifting demand between forest applies to a reasonable extent as between districts, and also as between the headquarters office in Washington and the work in the field. I am trying to cut down the amount of this money that goes into overhead offices and we propose to cut, and we have cut, in the items here given, on the amount of money that could be expended in the District of Columbia; and I want to be free to put further money out of the headquarters office into the field for increasing the work on the national forests to the extent that I am able to effect economies that will make that sort of thing possible; and also in order to meet a situation that may require increased expenditures in certain districts and make it possible to decrease in others. In my judgment the 10 per cent transfer authority should be retained.

NEED OF INCREASING NUMBER OF FOREST ASSISTANTS.

Just one other item of information. I have referred to the need for increasing the number of forest assistants or trained foresters and to the prospective volume of timber use that will come about whenever reasonably normal conditions are established in the forest industries. We have recently made a compilation of the pending inquiries for national forest timber from apparently responsible sources. I spoke of the sales that we have actually made this past year, which will represent $3,000,000 worth of increased business. Those are contracts that have actually been made. We have, in addition, 11 inquiries for large sales from apparently responsible sources, with a definite prospect that they will all be consummated within a relatively short time after normal industrial conditions are reestablished. Now, these 11 propositions represent an aggregate of about 2,000,000,000 feet of timber with 3,500,000 cords of pulp wood, and some 2,000,000 railroad crossties, with a stumpage of $6,000,000 at the initial rates put into our contracts, which are subject to readjustment at specified periods. In other words, the forest industries of the country are moving west. The census reports of lumber production show that the cut of lumber in the far western States is increasing while the cut of lumber in the far eastern States is decreasing, and that means that the national forest timber is coming more and more into demand, and I know that just as soon as the lumber industry is back on its normal footing we are going to be swamped with applications for national forest timber; and I want to be prepared to meet that situation—to meet this national demand, and do it with full plans for forest regrowth, running no risk of injury to the productive value of the property, and running no risk of forest depletion.

To do that we have got to have a force of technically trained men, and we have got to give these men from the schools a couple of years of practical experience before we can intrust them with the responsibility of handling these large transactions. For that reason I want to urge very strongly the recommendation for building up the technical force of men within the reasonable limits that the budget requests.

Mr. **Wason**. Is that the 25?

Col. **Greeley**. Twenty forest men and 10 grazing men—30 all told.

FIGHTING AND PREVENTING FOREST FIRES.

The next item is on page 99, fire fighting and preventing forest fires.

This fund, which has stood at $250,000 for several years, is not adequate, as evidenced by the necessity to request Congress for deficiency appropriations during 8 years out of the past 12. At the same time I do not want to see the emergency expenditures increased. I want to see them decreased, and consequently I have recommended to the Bureau of the Budget and now recommend to this committee that although this item has been inadequate 8 years out of the past 12 and is apt to be inadequate in future years except when we have unusually favorable conditions, that it should remain at this figure and that any increases given should be under the regular protective organization. That is the place where we need to build up, because to the extent that we can build up there and make that protective organization efficient expenditures under this item will decrease.

WAR DEPARTMENT AIRPLANE PATROL.

In making up the budget we have eliminated the appropriation carried during the past two years of $50,000 for cooperating with the War Department in maintaining an airplane patrol over certain national forests on the Pacific coast. This patrol has been shown to be a desirable adjunct to the other methods of protecting the national forests. It supplements our growing organization of lookouts and controls, but it can not take the place and we can not, because of the airplane control, reduce the force of men employed at lookout points and fire patrols on the ground. That has been very clearly demonstrated. The airplanes have been of special value for reconnaissance flights over areas where fires were burning. They have been able to aid the forest supervisors who had two or three machines on hand to get into a machine and within an hour's time get a very clear conception of the exact location of those fires, which way they were burning, and how they could best be attacked. When we have had bad lightning storms, as occur usually every year in every portion of the West, starting usually a large number of fires over a limited region, an airplane reconnaissance over that region, within two or three hours, has been very valuable to locate all the fires locally and enable the men on the ground to combat them effectively. There are periods when we have a smoke blanket at times when the airplane can detect new fires much more readily than the ground lookout. But to replace the ordinary ground organization we have found the airplanes will not work. It is a supplementary means of forest protection and can not replace the other organization that we have built up.

The Secretary of War announced last summer that on account of the need for economy and reduction in the expenses of the War Department it would not be possible for the War Department to continue to furnish machines or aviators for this work beyond the present summer. As a matter of fact, the actual allocation of War Department machines and personnel to do work of this character rests chiefly with the commanding generals of the corps areas, and it is quite probable that the commanding general of the corps areas of the Pacific coast will desire to have a certain number of machines to continue on this forest patrol for the sake of the value of the training to his aviators. The officers of the Air Service are very enthusiastic over the forest patrol as a means of training the Army aviators in a class of work which develops their resourcefulness and gives them a real job to do; and are very anxious to keep it up from that standpoint. But as the situation now rests there is a great deal of uncertainty as to whether the Army will be in a position to furnish aircraft in the future, and consequently as to whether the work can be continued at all. If Congress saw fit to continue the former appropriation for this work we could probable make some arrangement with the Air Service to continue a partial patrol.

The present Chief of the Air Service is very heartily in favor of it, because he believes in the value of it as training for his men as well as an adjunct for forest protection. But the situation being so uncertain and it being very evident that the War Department could not provide for it in a systematic, definite way, the Forest Service has concurred with the Bureau of the Budget in cutting this item out altogether. This represents a net reduction of $50,000.

Mr. LEE. Do you think that it is worth $50,000 to your service?

Col. GREELEY. I think that it has been, Mr. Lee. The Air Service men have discovered a great many fires. They have not discovered very many fires in advance of our ground lookouts, but they have discovered some. They have rendered a great deal of help to us in fire fighting and they have also been of tremendous educational value. When the people of the Western States see the airplanes flying overhead they realize that the Government is going after the forest fires in a spectacular way, which gets the need for precaution against fire across in a way which a less spectacular method would not do. In fact, some of the men in the woods ascribe miraculous powers to the aeroplane and are more careful than they otherwise would be.

Mr. LEE. How often do they scout around over the forests?

Col. GREELEY. Once a day. In my opinion it is a desirable thing, but stressed economy in these times shows that it is an activity that could be abandoned.

Mr. BUCHANAN. Is it your construction that this limitation on page 99 limiting it to $50,000 with the proviso that no part of this appropriation shall be used for the purchase of land or airplanes or for the construction of permanent buildings—is it your construction that that applies only to the $50,000 for cooperation with the War Department, or aside from that?

Col. GREELEY. Our construction is it limits it to the $50,000 for cooperation with the War Department. Before the inclusion of the $50,000 item for air patrol, the appropriation for fighting and preventing forest fires contained no such limitation. The limitation was added when the $50,000 was added.

Mr. ANDERSON. There is a reason for that. It is perfectly clear. Nobody knew whether this was going to be a permanent affair or not, and it was possible that just what is happening now might happen and Congress did not think it wise to leave this open to construction of expensive hangars, one thing and another, for housing of all these airplanes. That is all there is to that.

FOR SELECTION, ETC., OF LANDS WITHIN BOUNDARIES OF NATIONAL FORESTS.

Col. GREELEY. The next item on page 100 is for the location and classification and segregation of lands within the boundaries of the national forests, which contemplates a reduction of $15,000 below the appropriation for the current year. I am going to ask one of my associates, Mr. Kneipp, to tell us about the work that is done under that item.

Mr. KNEIPP. The item on page 100 of the estimates really embraces three separate activities. First, land classification, for which the estimated cost is $15,000; second, land exchange, estimated at $25,000, and third, entry surveys, estimated at $20,000. The total of the three items, $60,000, represents a reduction of $15,000 from the appropriation for the present year, due primarily to a reduction in land classification work.

These three activities have been and are continuing activities. The classification and entry survey work are, however, approaching completion. On the other hand, land exchange work is rapidly growing in volume. The purposes of the activities are (1) to determine the lands which should be permanently reserved for national forest purposes and thus permit rectification of the existing forest boundaries; (2) to determine the lands within the forests chiefly valuable for agricultural purposes and to segregate and make such lands available for settlement, and (3) to consolidate national forest lands through exchanges with owners of private lands within the forests.

Mr. **Anderson**. Within the national forests?

Mr. **Kneipp**. Yes. The land-classification work was initiated by the act of August 10, 1912. Since that date 141,870,167 acres of the land now within the national forests has been classified. Of this acreage 2,179,187 acres has been classified as listable on account of agricultural values, 1,091,904 acres has been found to contain agricultural values, but has not been listed because of the existence of superior timber or mineral values, or because of withdrawals for reservoir purposes in connection with irrigation or water power, and 138,608,076 acres have been classified as chiefly valuable for forest purposes and therefore nonlistable.

Mr. **Anderson**. Do you happen to know how much of that has been taken up in homesteads?

Mr. **Kneipp**. A very great proportion. Of course, after we list it with the General Land Office we do not retain a continuous record of its appropriation, and there has been no recent estimate of the amount filed upon and entered; but I would say by far the major portion has been filed upon.

Mr. **Anderson**. Are these surveys made by metes and bounds or by townships?

Mr. **Kneipp**. The entry surveys are made by metes and bounds where the tracts can not be adjusted to the township surveys. Wherever possible we adjust the claim to the township survey, getting the description down to as low as 2½-acre tracts, which is agreeable to the Department of the Interior. In many cases the land lies in unsurveyed territory and the contour is such that it can not be adapted to public-land surveys. In those cases it becomes necessary to run a metes and bounds survey around the land. The most of the surveys are in unsurveyed townships where, if it were not for that form of survey, it would be many, many years before the settler could get title to his land. In earlier years, at the beginning of this work, the settler had to pay for these surveys, which were sometimes very expensive, running up to as high as $500; but now the entry survey work puts him on a par with the settler on other public land which is surveyed at public expense.

The figures quoted do not include the extensive areas eliminated from the forests following classification work and therefore do not show the full extent of the land which by this process of classification has been found to be valuable for agricultural purposes and has been made available for entry and settlement.

Of the present forest area there remains to be classified a total of 12,906,354 acres. Of this area by far the greater portion, 12,768,644 acres, is in Alaska. The remainder, amounting to 137,710 acres, is in the continental United States.

In addition to the area remaining for classification we receive each year an average of about 100 requests for correction of the prevailing classification. These require further studies of the particular lands involved, which are quite expensive in proportion to the acreage covered. They result, however, in the determination and listing of agricultural lands which in the first classification were incorrectly classified.

Since the passage of the act of August 10, 1912, Congress has made available for this work about $725,000. This represents a cost of about one-half cent per acre classified, exclusive of the contributed time of men carried on the statutory roll and employed primarily on administration work. The cost for completing the classification will, however, be much greater per acre, due to the fact that most of the work will be in Alaska where transportation costs are high, where great distances will have to be traveled in the examination of the lands, and where all items of expense are greater than in the continental United States. The completion of the small projects remaining unclassified in the States, and the further examination involved in appeals for corrections, will necessarily require expenditures much heavier per acre than the average cost of the work to date.

The privately owned lands within the national forests amount to 25,154,414 acres, which is 14 per cent or approximately one-seventh of the gross area of the national forests. These lands are largely nonagricultural in character, and the major portion are valuable for forest purposes only. While they represent in part appropriations under the homestead laws, they embrace lands granted to States, railroads, and other grantors, and also lands appropriated under other than the homestead laws.

Mr. ANDERSON. Are they lands that have been cut over, or are they still in timber?

Mr. KNEIPP. Both. Some of them contain timber and some are cut over. The economic value of these lands is primarily for the production of forests. Some of them are valuable for grazing, but how long they will be valuable for grazing purposes in continued private ownership is problematical. These private holdings are widely interspersed among Government lands and by their location create a situation which greatly complicates the use, management, and protection of either the Government or the privately owned lands. Efficient utilization, management, or protection is best conducted within natural units of operation. The timber operator can log most economically and efficiently when he can take all of the timber within a unit, but with part of the land owned by the Government and part by private owners this frequently is impossible. The same condition prevails with relation to grazing use. In protection against fire, insect infestations, etc., complete coordination is necessary but very frequently unobtainable because of reluctance on the part of the private owner to participate in the work to the same degree as the Government, or, in some cases, because of legal restrictions which preclude governmental action along lines proposed by the private owner.

To meet this situation, Congress has already passed 14 acts authorizing exchanges within specified national forests and 7 acts permitting exchange with specifically named owners of private lands. It has pending before it a total of 33 bills for the same purpose. Thus far the Forest Service has consummated four exchanges with States involving 756,402 acres of base land, and 44 exchanges with private owners involving 156,422 acres of base land. At the present time four exchanges with States, embracing a total base area of 847,560 acres are pending. A number of exchanges with individuals have been carried to a tentative or preliminary stage, but have not yet reached the forester's office.

In order that the public interest shall be properly safeguarded and that there shall be absolutely no possibility of conditions such as were created by the old lieu land law, it is necessary that the base lands offered under acts of Congress and the lands to be selected in lieu thereof shall be carefully examined and appraised by officers of the Government. The costs of such examination and appraisal range from 1 cent per acre up to as high as 25 cents per acre in cases where very extensive timber values are involved. The average cost of examination and appraisal, however, is from 2 to 4 cents per acre.

Considering the extent of the legislation already passed by Congress, it may be proper to ask why more extensive exchanges with private owners have not been made. One reason has been the inability of the Forest Service to accept the basic land values demanded by the private owners. The heavy demand for grazing lands during the past several years has caused an advance in the price of that type of land which the Forest Service does not believe to be permanent. We are unable to assent to the values of $2.50, $3.50, or $4 placed by the owners on the property, while they, on the other hand, refuse to assent to the values of $1.25, or $1.50, or perhaps $0.75, which the Forest Service believes to be correct. The result has been a temporary deadlock which has restricted exchange negotiations. Another development has been the frankly expressed view of some private landowners that the public purposes to which the lands are to be devoted by the Government if acquired, and their adaptability to such purposes, warranted the Government in allowing for them a higher value per acre than they would command in the open market. Refusal to accede to this position has also retarded exchange negotiations. The policy of the Forest Service in handling exchange work has been, first, to approve only those exchanges which are in the public interest. Exchanges for the convenience or profit of private landowners are not deemed to be within the purview of the exchange legislation except when also advantageous to the Government.

Of course, because of the conditions previously outlined it is practicable for both the private landowner and the Government to benefit mutually from these exchanges without either party sacrificing any part of its interest. Another point always stressed is that the value of the base and selected lands shall be determined by careful appraisals, and that in making such appraisals only the market values established by transactions between willing purchasers and willing sellers will be recognized. In no instance are theoretical computations of yield or expectation values used in making appraisals. Continued insistence is laid upon the principle that the Government shall not and will not value offered lands at more than a private purchaser would have to pay for them under conditions of voluntary sale. Another point carefully guarded against is the establishment through exchange of a monopoly of the timber within a region or upon which a region is dependent. Another point always guarded against is a reduction in the county's share of the gross receipts from the sale of forest resources which would hurt the county financially.

The volume of future exchange work is wholly problematical, but if half the bills now pending in Congress become laws the exchange work will be very heavy. For illustration: One bill relating to three national forests in northern Idaho, which has passed both Houses in slightly different form and is now with the conference committee, would permit exchanges aggregating almost half a million acres. Senator Bursum's bill, S. 920, which has also passed both Houses in slightly different form and is now with the conferees, would authorize exchanges in any forest in New Mexico, and under its provisions a million acres or more may be offered in exchange. Senator Smoot's bill, S. 490, which has passed the Senate and is now before the House, authorizes exchanges in any national forest, and thus would embrace the entire 25,000,000 acres of privately owned lands, although, of course, much that would never be offered to or accepted by the Government for forest purposes.

Mr. ANDERSON. There is no legislation now which authorizes exchanges in general language?

Mr. KNEIPP. No, sir. None has been enacted so far. S. 490, introduced by Senator Smoot, is the one now pending.

The exchange work is important and valuable, first, to the Government in creating conditions whereby its valuable forest properties can be more economically administered, more efficiently protected, and better utilized, and to the private owner by making it possible for him to assemble his private holdings into units susceptible of the best use and management.

With regard to the entry survey item, at the present time there are between 400 and 500 claims under the act of June 11, 1906, within the national forests, requiring survey in order to permit the settlers thereon to obtain title to their lands. Of this number it is planned to survey 172 claims during the fiscal year 1923. The average cost of entry surveys during the last fiscal year was $184 per claim. On this basis the total cost of the work projected for 1923 will amount to approximately $31,000, and part of this will be made up by the contributed time of men employed primarily on other administrative work, and of draftsmen and clerks on the statutory roll. The amount of $20,000 requested in this item represents the remainder of the cost.

As the survey work approaches completion the claims requiring survey are more widely separated and in more inaccessible parts of the forests. Consequently the cost of survey per claim may be expected to increase as the number of claims diminishes. It is believed, however, that the work for 1923 can be completed within the limits indicated.

CONSTRUCTION OF SANITARY FACILITIES AND FOR FIRE PREVENTIVE MEASURES ON PUBLIC CAMP GROUNDS.

Mr. ANDERSON. We will take up the next item, which appears to be a new item, on page 101, for the construction of sanitary facilities, etc.

Col. GREELEY. This is a new appropriation item, but it is not a new line of work. Authority to do what is proposed in this item exists under the general power of the Secretary of Agriculture as defined by the laws concerning national forests to protect and administer them and to regulate their use. The Forest Service has expended very limited amounts for the purpose indicated in this item, from time to time, under the general expense appropriations for the national forests; chiefly, through using the time of forest officers when they could be made available for work of this character. But the situation has become so accute that in our judgment it must be recognized by Congress and funds should be specifically provided and the Service given the sanction of Congress to spend for this purpose. I do not wish to put into work of this character funds that Congress has appropriated with the primary object of improving fire protection of the national forests or providing for the administration of timber or of administration of grazing land; consequently we are asking Congress to consider this matter on its merits and provide a fund for that specific purpose.

As near as our rough estimates indicate there are some 6,000,000 people who visit the national forests annually for recreation purposes. At least 10 per cent of these people camp in the national forests for two or more days. As far as the data which has been assembled indicates there are actually about 1,200 camp fires on the national forests every day during the four months of the season when the public resorts to the national forests for recreational purposes. That is, recreation fires are camp fires, by recreation seekers, wholly aside from camp fires by herdsmen who are on the national forests with their flocks or at camp fires which are started in connection with economic uses.

Unextinguished camp fires are one of the causes of the six thousand and odd fires which our rangers have to put out every year. It runs just about 6,000 fires from year to year, and unextinguished camp fires are one of the causes of this general fire hazard. At the same time these people have every right to use the national forests. It is public property and their use of it for this purpose, in my judgment, is a very desirable use. I feel that the opportunity afforded by the national forests for these simple forms of recreation to the man of limited means, without entailing any considerable expense is a very fine form of public service.

I believe it should be encouraged to a reasonable limit. But at the same time we have got to recognize the specific problem which this form of use of the national forests does raise. There are some thousands of acres in the national forests which have been and are now used for camping purposes. The district forester, in California, advises me that there are 350 camping grounds in the national forests in that State that are commonly used. After making a very careful canvass and cutting the number down to the areas which are of such public importance and which are so extensively used as to make it necessary for the Government to consider this question of fire hazard and of sanitary conditions, we find that there are about 280 camp grounds throughout the national forests, all told, where the situation in this respect has become very serious. That is, camp grounds which are of such importance to the public and which are so intensively used that something must be done to guard against the fire hazard and also to maintain sanitary conditions.

Wherever it is possible to have public camp grounds improved by municipalities or public organizations, the Forest Service encourages that method of meeting this situation and we have asked for informal cooperation with a considerable number of municipalities or public organizations, associations of various kinds, under which these municipalities or associations assume the cost of camp ground improvement.

There are many examples of that sort of thing like the work that has been done by the city of Los Angeles in national forests of southern California in improving camps used as municipal playgrounds, fresh air grounds and that sort of thing, and where the cost of this work has been borne entirely by the municipalities which are interested in it, or by various public or philanthropic organizations in such municipalities. But in very many cases it is not possible to meet the situation in that way and we are confronted with the necessity of cleaning up these camp grounds of inflammable débris; of constructing very simple fire pits or stone fireplaces, to prevent the use of the camp grounds by perhaps two or three hundred different parties at the same time from becoming a serious fire menace; and also the installation of rough and inexpensive latrines, garbage pits, and incinerators to prevent these places from becoming a real menace to the health as well as an affront to common decency.

We have actually a good many camp grounds in the national forests to-day where the sanitary conditions because of intensive use have become deplorable. The condition of some of these camp grounds has been criticized by health officers in those States. It is partly a health matter, as there is danger of pollution of streams, and it is partly a question of maintaining the camp ground itself in a condition which will protect the health of the people camping there and the traveling public, and also prevent it from becoming in such a state of filth as to violate the common conception of decency in an area of that character under public ownership.

The Forest Service is meeting this situation as best it can, making men available at odd times, by constructing facilities of this sort and by furnishing a ranger who will get the campers together and persuade them to put in a day or so in putting up some simple toilets. placed at the right points, where they will not be in any danger of polluting streams and that sort of thing.

Now, we have simply been swamped by the volume of this sort of use of our camp grounds. Narrowing the proposition down to the 280 sites which are already so intensively used by campers—those are areas on many of which several hundred campers are camping at the same time—and estimating that each of them can be equipped with very simple latrines, fireplaces, and fireplace clearings for $130, which indicates that we have only the simplest and most rudimentary improvements in mind, indicates that $36,400 would be necessary to put the existing camp grounds which are intensively used in proper condition. Now, that is the problem. We are not waiting on Congress, but we are going right ahead and meeting it the best we can. At the same time we believe that the situation is such that it should be recognized by Congress, and for that reason we have asked for this special appropriation of $10,000, which would be employed for temporary labor and for materials in making the improvements of the character indicated where the need for them is most pressing. It would be a small fund, obviously inadequate to handle the whole situation, but it would enable us to take care of the most urgent cases and it would also put us in a position to secure a lot of cooperation—local cooperation and personal cooperation—on the basis of the Government doing a part of the work if these local parties or communities interested will carry their share.

Mr. **Anderson**. May I inquire at this point if these campers are people who come periodically to camp from nearby places or people who go through as tourists, or what?

Col. **Greeley**. We have every brand, Mr. Chairman. The people who come periodically, particularly the people who live in the same State, usually avoid these crowded camps. They either have acquired a summer-home site of their own or they pick out their own areas and get back from the beaten track and in an area of their own. Those campers do not present any problem to us. They are people who know the mountains and can take care of themselves. The situation is really caused by tourists who come in their Ford cars from Kansas and Nebraska and Iowa, and from many other States and who want to get a place to camp. They often bring their beds stacked on the running boards of their cars and they like to stop at these prominent places near the main traveled road where people congregate. That is really what creates the situation. The number of them is increasing enormously.

Mr. **Lee**. Do they camp for a few days or just one night?

Col. **Greeley**. They may camp at one place for a night, or often they stay a week; and then they get in caravans and travel and stop at the different stations. We are very glad to have them, but we have got to take care of this situation.

Mr. **Buchanan**. You spoke of a fireplace. What do you mean by that?

Col. **Greeley**. Simply to avoid starting promiscuous fires.

Mr. **Buchanan**. Two or three hundred people could not use one fireplace.

Col. **Greeley**. Oh, no. We simply clean up the stones and build little pits out of them, two or three dozen of them.

Mr. **Buchanan**. You would then require all of them to cook there?

Col. **Greeley**. Yes, sir. Of course, we can not control these places as closely as a city park. We can not keep men there. Although we have had to arrange for guards watching some of the most commonly used camps when fires have gotten out. But what we want to do, as to the fire end of it, is to clean up the camp ground of inflammable débris and then put up some little stone fireplaces instead of having the people start fires promiscuously.

Mr. **Buchanan**. Do you keep these camping places cleared of dead leaves and things of that sort?

Col. **Greeley**. Well, we can hardly hope to clean them up to that degree, but we do clean away the falling trees and limbs and the brush, for that would start a serious fire; and then we would endeavor to clean around these little fireplaces, to burn off the area or rake off the area to prevent the spread of fire.

Mr. **Buchanan**. You think the principal fires come from camp fires?

Col. **Greeley**. Not the principal fires. About 18 per cent of the fires come from campers.

Mr. **Anderson**. We will take up the next item.

FOR PURCHASE AND MAINTENANCE OF FIELD, OFFICE, AND LABORATORY SUPPLIES, ETC.

Col. GREELEY. For the purchase and maintenance of supplies and equipment. Mr. Headley will explain that item.

Mr. HEADLEY. There is no increase asked for in this item, Mr. Chairman. That does not mean that we are adequately supplied with either current supplies or permanent equipment, but we want to try for another year to see what ways and means we can devise of making this money go further. We are pretty badly handicapped by the lack of equipment, such as lack of portable telephones. There has been a portable telephone developed by one of our own engineers, so light that it can almost be carried in a man's pocket. It can very readily be carried by a ranger on his saddle horse, and that means that in the summer time the district ranger, who is responsible for the fire protection, often assisted by a force of from 5 to 25 guards, can during the ordinary period of fire danger go about over his district, about his work, and still keep in touch with the fire situation. That is, if he has a portable telephone which he can take with him he can, once or twice a day, or as often as necessary, hook in his temporary telephone and call up headquarters and find out if any developments have been reported, if any fires have started, or anything he he needs to know about it. If not, he can go about his regular inspection business, inspecting guards and laborers under his supervision. In that way we get a double functioning from him that we can not get if he has to stay at his headquarters all the time and keep in touch with the fire situation.

We are short of fire-finding equipment in lookout stations. We find that speed is the essence of success in controlling fires and that speed turns first of all on the work of the lookout in detecting and giving a correct report of the location of a fire. If he has dilapidated fire finder, he is quite likely to give an erroneous report of the location of a fire, and that may cause the guard who has been sent to extinguish the fire the loss of a day, and it very often is long enough to mean the difference between a fire being caught and being put out in its incipiency and a fire that is not caught in its incipiency; and maybe a great conflagration results, destroying timber and doing all sorts of damage; in addition costing the Government considerable money for its suppression.

Then we are in need of packing equipment due to the fact that pack horses are no longer to be hired for fire fighting, and we are being forced to furnish our own packing equipment in inaccessible regions.

The use of this fund is to buy equipment to be carried in the two equipment depots, one here and one at Ogden, Utah, purchases to be made as far as possible from manufacturers and stock kept at each depot; and we are endeavoring to centralize the purchase of all items that lend themselves to that method of handling.

Col. GREELEY. There is one thing that I would like to add, Mr. Chairman. To make the situation clear to the committee, we are not able to equip the national forests with the material that they need entirely from this item. We are compelled to draw upon the general expenses appropriation for the national forests to some extent for equipment or emergency equipment, things like a telephone wire for running out to emergency fire camps and things of that kind, which indicates that the item in its present amount is not large enough to accomplish in full the purpose intended. But as Mr. Headley indicated we think we can get along with the existing appropriation and no increase has been asked for, although the existing amount does necessitate drawing on the national forest appropriation to supplement this appropriation.

FOR INVESTIGATIONS OF METHODS OF WOOD DISTILLATION, ETC.

Mr. Anderson. We will take up the next item.

Col. Greeley. The next item is on page 103, for the investigation of methods of wood distillation, etc., and is one of long standing and covers a wide range of technical investigations designed to reduce waste of forest products and for their utilization. This work has become one of the regular activities of the Forest Service because it is now generally recognized that the reduction of waste in the use of timber is almost as important or perhaps fully as important as securing reforestation of cut-over lands in order to work out effectively the problem of timber supply for the United States in the future.

The present item of $325,000 is used in part for economic investigation and timber studies, conducted from the office of the Forest Service in Washington, and in part for the investigations that appear necessary in connection with our district offices at the three points in the principal timbered sections of the Northwest, but the principal part is used in connection with the forest products laboratory at Madison, Wis.

The work done under this office at Washington consists of censuses of lumber production carried on from year to year in cooperation with the Bureau of the Census, similar canvasses made of such things as consumption of pulp wood in connection with the industrial associations interested in that subject, canvasses of the extent of wood preservation and other statistical work which is demanded for public information as to the situation affecting forest industries.

Other studies of important timber species are conducted from the Washington office from time to time, together with surveys of the economic situation of important timber consuming and timber manufacturing States. For example, we have recently made surveys of the timber-using industries in New York and North Carolina in connection with the State departments of forestry to ascertain the exact situation of the timber industry in those States, the supplies they have left, and the problems in utilization which are arising in those industries.

We have undertaken a somewhat similar survey in the State of Michigan, where the situation of the wood-using industries is becoming more and more critical, to ascertain just what the State has in the way of timber resources adapted to requirements of wood-using industries, where their supplies are coming from, the probable duration of those supplies, and the general situation which confronts those industries. All told, including the overhead administration on forest products investigations, $38,460 are expended in Washington.

In the national forest districts, on the Pacific coast, and in northern Idaho and western Montana, covering the five States which contain the greater part of all the timber land in the country and where the forest industries are on a rapid increase, and many industrial problems are coming up in connection with the expansion of those forest industries, we maintain small groups of experts in this subject to study such problems as current practices in seasoning timber, both by kiln drying and air seasoning, and how the seasoning problem of those regions can be worked out; such problems as logging costs and the factors involved in logging costs, in which there are opportunities for very marked improvement in that region; such problems as studies of the actual handling of mill run from lumber manufacturing in different species, etc.

In connection with that we take up local problems which are of local importance, something like the situation that has arisen in San Francisco Bay, where vast destruction of piers and wharves is threatened on account of the sudden increase in the destruction by marine borers; that is, the destruction by borers of timbers and piling used in construction of this sort.

The greater part of this appropriation, aggregating $259,750, is expended on the forest products laboratory at Madison, Wis., where the intensive investigations of timber utilization are centered and equipment and personnel supplied for fundamental research in many different phases of the use of timber.

I will not take the time of the committee to attempt to detail a description of that institution which has many interesting phases. Just to mention a few of the higher points. One of its sections deals with elimination of waste in the various stages of timber manufacture by working out standardized specifications under which the log can be cut up into sizes and dimensions suitable to final fabrication at the furniture factory, vehicle plant, wood-turning plant, and other wood-using industries. It is astonishing to appreciate the possible savings in such a purely mechanical thing as this. The wood-using industry in the United States consumes over 8,000,000 board feet annually and their past practice has been to stock the plants in lumber sizes, resaw it into small sizes, into sticks of the sizes used in the plant that turns an automobile part, or an ax handle, or a rake handle, with a tremendous loss at almost every stage of the game—loss in material, loss in freight charges paid on a large part of material not actually used, and loss of timber in fabrication.

It appears possible to reduce the drain on our high-grade lumber by easily 2,000,000,000 feet annually through standardizing the dimensions for cutting up the material at the sawmill designed for ultimate remanufacture into various highly fabricated products; and to work out that whole problem of adjustment between the primary operation at the sawmill and the secondary process of fabrication is one of the great big sources of reducing wastes that the laboratory has undertaken to eliminate.

Another project in that same connection is the standardization of the very conflicting lumber specifications which are used in different regions and by different groups of manufacturers, in order to greatly simplify and to coordinate the marketing and use of lumber in all parts of the country, and to avoid the conclusion that is now very prevalent because of the use of the "rule-of-thumb" method of grading lumber that has grown up in different regions and under various manufacturing associations.

Another section of the laboratory, called the section of derived products, conducts an investigation into the chemical composition of woods, developing fundamental data that often has no immediate commercial bearing but is of fundamental importance in many industries. The range of its work includes all the forms of distillation of wood for the production of various products and the refinement of the distillates, including studies of working out ways and means of extending the life of the raw material for the production of naval stores, since the present available timber for turpentine is becoming extremely limited in extent, so that naval stores industries are threatened with gradual extinction unless new means of conserving the raw material are worked out.

Another investigation at the laboratory in the nature of physics is that which covers the problem of seasoning timber by kiln drying and air drying, and tests to determine the structure of the timber and its strength under various forms of stress. This form has done more to benefit the contractors and architects and designers or builders in the country than any other work we have done in the laboratory. We have carried on tests there to show how all American woods are to be designed for structural purposes and worked out a standardized system, so that the strength value of any wood can be very readily determined; and that now is the basis of all building codes of the country, because of its practical value to architects and designers.

Another section conducts tests of boxes and containers of all types in an effort to reduce loss and waste due to improper manufacture of boxes, barrels, and other wooden containers. A container has been designed which meets the proper tests corresponding closely to the actual treatment containers receive in actual transit and details of construction, and therefore furnishes a basis for working out improvements.

Mr. ANDERSON. In this connection I saw some figures the other day which showed some alarming statistics of damages resulting from the use of cardboard containers.

Col. GREELEY. That is a very important problem. The manufacture of fiber boxes has increased enormously, and because of the rising cost of lumber there has been a pronounced effort by manufacturers to find a cheaper form of container. I think, as a matter of fact, the claims made on the railroads annually for damages in transit amount to about $100,000,000.

Mr. ANDERSON. I do not recall the figures, but I think they have increased from about $28,000,000 to something like $100,000,000 in the last three or four years.

Col. GREELEY. Yes, sir; and the great principal reason for that is faulty containers.

The committee may be interested in the methods used at the laboratory. We have constructed there an enormous steel drum, which contains cleats set crosswise at the end of the cylinder at cross points, and a box or barrel or cardboard box loaded exactly as it is to be loaded in shipment is placed in this drum. The drum is then rotated, and the box is knocked about, duplicating very closely the exact treatment which it receives in transit, until it fails.

By putting a couple dozen boxes, loaded as they would be loaded for shipment, through that process it is very easy to determine where the principal weakness exists; whether it is in the thickness of the material; whether it is in the way the corners are made, or whether it is the way the boxes are nailed. We can determine the effect of a single additional nail in the side of a box, and we can determine the average efficiency of various boxes by a series of simple tests of this character. The comparative value of fiber or pulp made boxes or lumber boxes is determined in the same way, as well as the effect of strapping or wiring boxes. All of these problems are susceptible of an exact scientific study by that method. A great many companies are coming to the laboratory and asking to have their boxes tested and improvements in the design of the boxes worked out. We recently tested one of the famous and widely advertised brands of trunks loaded to 300 pounds, and we found that the best grade withstood 5,000 jolts before it broke, and one of the poorer grades broke at about the thousandth jolt.

Another section of the laboratory deals with timber preservation, taking up such subjects as the preservative treatment of mining timber where there is a very great loss because of the rapid decay of timber used for mining purposes; the preservative treatment of railroad ties and the perfection of a process for gluing wood in the form of laminated structures.

There has been a marked development of this in the last few years and it is one of the ways in which the industries of the country are trying to meet the shortage of high-grade material and the high cost of such material; instead of using a solid beam or a solid piece of wood, using inch boards glued together and then cut down into the form desired. For example, it is the comon form of construction of airplane propellers. During the war it would have been absolutely impossible to manufacture the propellers called for if solid wood had been used, but the laminated type of construction was developed and it is a perfectly practicable and desirable form of substitution provided the methods of gluing are based on sound facts. That is one of the problems the laboratory is working on.

Another section deals with pulp and paper studies. That section has been working for 14 years on the suitability of different American woods for pulp and paper manufacture, and has obtained an exact test of the paper-making qualities and the paper yields of about 100 species of American woods. The range of problems in pulp and paper manufacture are so enormous that we feel we have scarcely made a beginning. Things are constantly arising and problems are constantly being presented to the laboratory for solution such, for example, as bleaching the pulps which can be manufactured from long-leaf pine timber and other Southern pine timber so as to produce a good grade of paper. That is something that has been worked out by the laboratory and will shortly be put in practice commercially.

The extension of the paper industry through the use of new woods, like jack pine in the Lake States, has brought up a whole range of problems on how to handle that particular species, so that the pulp and paper section has a very wide field still before it.

As presented in the Budget this item contains an increase of $15,000 and two words have been inserted in the language. In the third line from the end the words "and fiber" have been inserted so as to provide definitely for investigations and experiments to promote economy in the use of forest and fiber products. The reason for the insertion of those two words and for requesting the increase of $15,000 is the desirability of using the facilities at the Laboratory for the development of other vegetable fibers besides wood for the manufacture of various grades of paper. The specific purpose we have in mind in requesting this item is to develop the use of flax straw as a substitute for linen rags or linen waste in the manufacture of bond paper, bank notes, parchment, and other high-grade papers. There are approximately one and a half million tons of flax straw grown in the North Central States in connection with the production of flaxseed which is now burned annually because there is no profitable market for it. At the same time, on account of the falling off in the imports of linen waste and tow, particularly from Russia, there is a serious shortage of flax fiber required in the manufacture of high grades of paper. From a laboratory standpoint it seems to be entirely feasible to treat the flax straw so as to make it serviceable as fiber in the manufacture of these grades of paper.

Mr. **Anderson**. Does it require any different treatment than is required in the case of fiber from cloth?

Col. **Greeley**. Yes, sir; it requires a special process of separating the tow in such a form that it can be readily pulped. As a laboratory experiment the project appears to be entirely feasible, but it has got to be worked out on a basis that will be commercially feasible and methods and appliances have got to be perfected on a commercial basis before the use of this material can be actually accomplished. There appears to be here an opportunity to convert a waste agricultural product into a valuable raw material for the manufacture of a very high-grade product to the benefit of both the farmer and the manufacturer, and the opportunity to accomplish it appears to be so good and, in fact, the project is of such importance from both standpoints that an increase has been requested for that particular purpose.

There are other vegetable fibers that should be studied. A large opportunity exists for the use of cotton linters in paper manufacture. We have done a little work on oat hulls, for example, a by-product in the manufacture of very common brands of food, and it has been shown that those fibers are entirely practicable for use in manufacturing relatively low-grade forms of paper or other pulp products. Hemp refuse and fibrous plants, like the Spanish bayonet, all have their possibilities, and as the supply of linen rags, which has been the basis of high-grade paper hitherto, becomes more and more scarce, it is of special importance that these fibers be thoroughly tested to determine their practicability.

There is no duplication of this work in the various laboratories. Some time ago the Bureau of Plant Industry initiated investigations in the field of vegetable fibers, but their work has been abandoned and their equipment has been turned over to the Forest Products Laboratory, and there is no other governmental agency that is conducting such investigations.

Mr. **Anderson**. Did not the Bureau of Markets conduct some investigations of this kind at one time?

Col. **Greeley**. I am not aware of it.

Mr. **Clapp**. I think the man who started the work in the Bureau of Plant Industry was transferred to the Bureau of Markets and the work was done in the Bureau of Markets.

Mr. **Anderson**. That was my impression.

Col. GREELEY. But it is not done there now?

Mr. CLAPP. No; there is no such work being done.

Col. GREELEY. At the present time all of this work for the department has been concentrated in the Forest Products Laboratory, and there is no agency outside of the Department of Agriculture that is undertaking such investigations. So we believe it is a desirable expansion of the work of the Forest Products Laboratory even at the present time when economy is the word of the day.

Mr. ANDERSON. I have received a lot of letters recently in regard to some proposal for an additional $100,000 in this appropriation, which evidently contemplated some sort of extension work in the form of carrying out the results of these experiments into the trade. I do not know where it originated but it has been very voluminous.

Col. GREELEY. Well, I can enlighten you a little bit on that point. There are some very active men in the various associations of wood-using industries that have been in pretty close touch personally with the work at the laboratory and who are very anxious to have provision made by which the laboratory can go out aggressively and demonstrate what it has done in commercial plants and to the plant superintendents and their employees. My own feeling is that a certain amount of extension work of that character is desirable, in line with the extension service of the Department of Agriculture which gets over to the farmer, by practical demonstration and instruction on his own farm, what the experts of the department have worked out in the way of improvements. I did not recommend to the Director of the Budget or to the Secretary of Agriculture an increase in the appropriation for that purpose, although I feel that within reasonable limits an appropriation for that purpose would be desirable and would bring good results. The main question there is how far the Government, after developing improved methods, should teach them to the industries that ought to use them.

Mr. ANDERSON. This is a very large and very well organized industry. There is a number of associations which appear to be pretty well financed in some directions and are pretty thoroughly capable of carrying this stuff out to their own members if they think it is of sufficient consequence to do it, and while it is very difficult to draw a line of demarkation between proper demonstration on the part of the Government and the proper interest of the people in the industry in their own business, still it does seem to me, in the main at least, that the industry is quite able to take care of that phase of it.

Col. GREELEY. The laboratory is doing a considerable amount of extension work at the present time, and much of it we are doing on the basis that the people who benefit by it shall pay a reasonable part of the cost. We have authority to accept cooperative funds for such purposes. For example, we have been giving from time to time a practical course in box construction at Madison, which course lasts about two weeks. Makers of boxes are invited to send their plant superintendents and foremen to take that course and pay the cost of it. We get a group of these practical box makers there for a couple of weeks and then drill the essentials right into them and show them the whole thing. We have arranged some similar courses in kiln-drying. We invite sawmill operators to send their kiln superintendents or their kiln foremen to the laboratory for two or three weeks and put them through a course of practical instruction, they paying the cost of it. In such ways as that I think extension work is very desirable, and I would be in favor of going part way in the direction that these gentlemen you refer to advocate.

THURSDAY, FEBRUARY 2, 1922.

Mr. ANDERSON. I think the next item was the item on page 105. For experiments and investigations of range conditions within the national forests or elsewhere on the public range and of methods for improving the range by reseeding, regulation of grazing, and other means.

TRANSFER OF EMPLOYEES FROM STATUTORY TO LUMP-SUM ROLL.

Col. GREELEY. Before taking up that item, Mr. Chairman, may I give the committee a figure or two bearing upon points that were under discussion yesterday afternoon?

Mr. ANDERSON. Surely.

Col. GREELEY. In regard to the question raised by Mr. Buchanan as to our proposed transfer from the statutory to the miscellaneous roll. I just want to say this for the information of the committee.

As our appropriation is now drawn, under various lump-sum items we are carrying over 500 technical and administrative employees on lump-sum rolls. Those include 124 administrative employees, district foresters, assistant district foresters, inspectors, and my own immediate associates in the headquarters office at Washington, whose duties are even more responsible in character than those of the forester supervisors. Our miscellaneous roll includes 322 professional, scientific, and technical employees. It also includes at the present time 14 supervisors, 7 deputy supervisors, and 64 forest rangers, men of the identical grades as those employed under the present statutory item which we have transferred to the miscellaneous roll. Our present miscellaneous roll also includes 69 logging engineers, scalers, and lumbermen.

The point that I wish to emphasize is that as the appropriation act is now drawn the employees of the Forest Service engaged upon these executive and technical duties are split. Part of them are on the statutory roll and part of them are on the lump-sum roll, and in the proposal which we have made in the Budget to put all of the employees in these grades upon the lump-sum roll we believe that we are simply putting into effect the most consistent and most workable system, and one which Congress has already sanctioned as far as the Forest Service and the Department of Agriculture is concerned.

As to the danger that the Forest Service might run wild in promoting employees transferred to the miscellaneous roll, I wish simply to cite this fact, that taking our existing miscellaneous roll of employees whose salaries are under our own control, subject to approval of all promotions by the Secretary of Agriculture, in the past 11 years the actual promotions, including promotions made to fill vacancies in the higher positions, have averaged an increase of $66 per annum per employee on the miscellaneous roll. I cite that fact simply to show that a conservative policy has been followed, and that so far as the past record of the department is concerned I do not think Congress need have any fear that further transfers to the miscellaneous roll will result in any extreme policy of promotions. As indicated yesterday, the very circumstances of the case forbid that, because our total fund available for employees of these grades is not increased and we could not finance extensive promotions in any event.

Mr: **Buchanan.** You do not seem to recognize the fact that while there may have been good men in the administration of the Agricultural Department heretofore, if we change this system to the lump-sum roll it would probably be a change for all time, and we have no guaranty that hereafter we will have the same character of men to administer that policy; and the question in government is to so fix your laws that they can not be abused. The only objection I have to your statement is that you did not reverse it the other way and put them all on the statutory roll.

Col. **Greeley.** We do not want any abuse of the laws, but we want efficient work. You want to have the work in these departments done efficiently.

Mr. **Buchanan.** It is better to have the work retarded and be sure the work is clean and honest than it would be to have a lump-sum that way, and if an efficient man happens to be in at one time, he succeeds in it, and at another time a dishonest man may get it and promote a lot of employees and stand in with the employees, and everything of that character, As I say, in the future we do not know what character of administrators we will have in the department. We hope they will be as good as they are now, and as good in the future as in the past; but we do not know that they will be. And it is our duty to so safeguard these amounts that abuse can not occur.

Col. **Greeley.** My only purpose in reopening this question was to put before the committee the present situation as to the division of our employees between the two rolls, also the actual record as to the extent of promotion on the miscellaneous roll during the past 10 years.

One other point——

Mr. **Anderson.** Right there. There is perhaps one thing that might differentiate this bureau from some others. Of course, the work in the Forest Service, I take it, is essentially that of business administration, which is not true of a good many of the Government departments, and perhaps a larger latitude is essential to a business administration in that service than would be to ordinary scientific investigational work or to the ordinary statistical and clerical services of the Government.

Col. **Greeley.** Yes, sir.

Mr. **Anderson.** At the same time, as a practical proposition, the policy of Congress is clearly opposed to the extension of lump-sum appropriations, and all things that have been done recently are clearly in the other direction.

Col. **Greeley.** Well, is it not true, Mr. Chairman, that a great many of the more recent Government services established have been given very wide latitude in this matter?

Mr. **Anderson.** Yes; and that wide latitude has been very much abused.

Mr. **Buchanan.** That is the trouble.

Col. **Greeley**. I remember one service that was provided for on a provision that employees should be engaged for certain duties and salaries were specified by classes.

Mr. **Anderson**. Yes.

Col. **Greeley**. So many might be employed at not to exceed a certain rate of pay, and so many employed at not to exceed a certain lower rate of pay. If something of that sort could be done here it would materially relieve our situation. It is exactly as the chairman put it, we are trying to maintain an efficient service and we must have efficient business men who are competent. Their work is technical and commercial combined, and it is very difficult to handle that business effectively and keep the right men in the right places under the statutory roll limitation.

The other point that I wish to refer to is in reference to your question, Mr. Anderson, as to how the fund for fighting and preventing forest fires is utilized in relation to the national forest appropriation?

During the past calendar year we have expended a total of $509,000 for fighting and preventing forest fires, under the original appropriation plus the emergency appropriation, which was subsequently made. Out of that amount, $76,000 were used for the employment of emergency guards, increasing the force of guards when the conditions assumed an emergency character, and it was imparative to have more men on the ground to catch as many of the small fires as possible. The remainder, $433,000, was expended during the past year for the actual suppression of fires through the employment of additional labor and purchase of supplies. In other words, we are using the authority which is given us under that item very cautiously. We are not permitting the item to be absorbed under the regular forest organization, because if the fire season is favorable and it is possible not to draw havily upon that item, we only want to draw upon a portion of it and let the balance lapse into the Treasury. We feel we are under an obligation to do that. For that reason we hold that as an emergency item, and when the practical meeting of an emergency requires the employment of additional guards to be stationed in the worst areas where the greatest number of fires are being started, we employ that method simply as the common sense means of meeting the situation. We hold it as a strictly emergency fund, and the great bulk of it is actually expended for extinguishing fires which the field organization is not able to cope with.

FOR EXPERIMENTS AND INVESTIGATIONS OF RANGE CONDITIONS.

If you are ready for the next paragraph, experiments and investigations of range conditions, I will ask Mr. Rachford to discuss this before the committee. Mr. Rachford is in charge of the grazing.

Mr. **Rachford**. Mr. Chairman, range investigations on the national forest have been conducted to determine the best methods of use consistent with other related resources, and at the same time secure full use of the forage crop.

These investigations have been along fundamental and practical lines. They have developed methods of management of both the range forage and the range live stock which secures maintenance and improvement of the forage. This, in turn, has made it possible to increase the number of stock grazed without detrimental effect to the forage; has increased the calf crop and lamb crop; increased the growth of animals; and there has been a reduction in the loss, and it has also increased the profits to the growers more than sufficiently to offset the increased operating expenses that are necessary sometimes to install the improved methods of management which have resulted from these investigations.

The $35,000 item is the same as it has been for several years. Included within that item is $8,100 which is for the purpose of maintaining the Great Basin Experiment Station in central Utah. This is the place where the principal fundamental range investigations are carried on, such investigations as forage management, which will allow revegetation of depleted ranges and maintain the productivity of the range. It also includes artificial reseeding of ranges and ascertaining what species are best adapted to different conditions and different localities. It also includes an investigation of the vigor of plants which will determine the different intensities of use at different times of the year that might be permitted on the range.

There is another investigation which is to determine what principal typical plants might indicate overgrazing at any time of the year.

Other investigations at this station that are being conducted are the relation of climate to plant growth; the relation of grazing to erosion and stream flow, and means of checking erosion and excessive run-off; more economical and efficient methods of eradicating poisonous plants, and live stock management for control of losses of live stock on the range.

Mr. ANDERSON. How do these investigations differ from apparently similar ones conducted by the Bureau of Plant Industry?

Mr. RACHFORD. There is no duplication at all, Mr. Chairman. The investigations that we are carrying on at the Great Basin Experiment Station, and also at other places, are not being carried on by the Bureau of Plant Industry or the Bureau of Animal Industry. The Bureau of Animal Industry determines what plants are poisonous and we are determining effective means of eradicating those plants.

Mr. ANDERSON. That is confined to range plants?

Mr. RACHFORD. Yes. Included also within the item is an item of $9,450 for the maintenance of the Santa Rita Range Reserve in Arizona and the Jornada Range Reserve in New Mexico. These two stations are used for the purpose of develping the proper forage management to stablize and maintain the productivity of the range and the possibility of artificially reseeding the range. They also involve the proper stocking of the range and the proper methods of management of live stock.

As the result of these investigations or experiments, the Santa Rita Range Reserve has shown that through better methods of management of the range and live stock the cost of producing a yearling has been reduced by $7.31 per head. That is quite comparable to the results secured on the Jornada.

Mr. ANDERSON. That figure is rather empirical, is it not?

Mr. RACHFORD. No; it is obtained in this way, Mr. Chairman: Running expenses have been reduced 3 per cent in the loss, and a reduction in man and horse expense, after offsetting the cost of improvement of a total of $2.56 per head; through the increase in calf crop of 15 per cent; and improvement of the grade of calves produced; an indirect saving of about $4.75; and a total amounting to about $7.31 per head per year.

Mr. **Anderson.** To what extent have you been able to increase the number of cattle on the ranges through better range management?

Mr. **Rachford.** We have increased since 1908 approximately 1,000,000 head of cattle and one-half million head of sheep.

Mr. **Anderson.** What I am getting at is, is that due to additional acres brought into range, or is it due to better management on range already existing?

Mr. **Rachford.** Since that time I believe we have an additional acreage of about 10,000,000 acres. It has been due largely to better methods of management and applying the results of investigations obtained at the experiment stations.

Included also within this item is an item of $4,900 to cover the cost of economic range botany work, which involves the collection and identification of range plants, of maintaining an herbarium in the Washington office, and the collection, analysis, and presentation of data on the distribution and economic value of range plants.

Mr. **Buchanan.** What are these researches into such things as that made for?

Mr. **Rachford.** They are made for this reason, Mr. Buchanan: Every range is composed of a different composition of vegetation and each tract of range often has to have a different method of management. By securing accurate data on the palatability of different species and the composition of different types of range we can develop the method of management best suited to the type of range.

Mr. **Buchanan.** You mean the variety of plants?

Mr. **Rachford.** Yes.

Mr. **Buchanan.** Is not that running right into the Bureau of Plant Industry? As I understand it, the Bureau of Plant Industry goes into all those things—the adaptability of certain plants, the different climatic conditions and soil conditions throughout the United States. It seems to me that you are duplicating their efforts beyond any question.

Another feature was that you said the artificial seeding of the pastures, or the range, and that is another thing they go into very fully, as to what seeds are adapted to certain things, and what character of plants are adapted to certain communities, certain soil conditions, and certain climatic conditions. I do not see how you can keep from running into the Bureau of Plant Industry there.

Mr. **Rachford.** I think you will find the Bureau of Plant Industry's investigations are not extended to the national forest ranges and national forest range plants.

Mr. **Buchanan.** That may be; but you could submit the samples you collect or anything of that sort. They are certainly here to do it and it looks to me as though it would be one of their primary duties to look after our own forest ranges with the equipment that we furnish them.

Mr. **Rachford.** Let me state also in that connection that this work is done in cooperation with the Bureau of Plant Industry. In other words, we are obtaining plant specimens from all parts of the national forest ranges. These plant specimens are referred to the Bureau of Plant Industry for identification.

RESEEDING OF RANGES.

Mr. BUCHANAN. Well, let me ask you a little practical question: Has there ever been any reseeding of range?

Mr. RACHFORD. Yes, sir; there has been. We have carried on about 600 different projects of artificial seeding.

Mr. BUCHANAN. What territory have you reseeded and how?

Mr. RACHFORD. We have reseeded—perhaps Mr. Chapline could tell that with more accuracy.

Mr. CHAPLINE. The tests have been largely of an experimental nature, and we have reseeded certain pasturages within the national forests where it has been proven they can be seeded. The exact acreage of that seeding I can not say, but it is probably around 20,000 acres in the national forests.

The land located within the national forests is largely of semidesert character, or of low rainfall, and it is only in meadowlike areas where it is possible to seed artificially and do it practically and economically.

Mr. BUCHANAN. Just for grazing purposes, this reseeding is done?

Mr. CHAPLINE. Yes; for grazing purposes.

Mr. BUCHANAN. How many years have you been engaged in this work?

Mr. CHAPLINE. Most of the artificial reseeding tests were made early, before 1913, and since that time we have been working on a small scale to determine especially the plants that could be seeded on these meadow areas. We have never had the funds to artifically reseed on a large scale. Some of the ranger station pastures have been reseeded, and some of the stockmen have done some reseeding at their own expense.

Mr. BUCHANAN. Do you recall what character of plant seed you put on?

Mr. CHAPLINE. We have tried both the native vegetation and cultivated species.

Mr. BUCHANAN. Wheat or grass or what?

Mr. CHAPLINE. Grass, mostly.

Mr. BUCHANAN. Grass?

Mr. CHAPLINE. Yes, sir; mostly cultivated grasses—timothy, blue grass, brome grass, red top.

Mr. BUCHANAN. Do you plant them with plows or just throw it out on the ground?

Mr. CHAPLINE. It is mostly done by harrowing. They throw the seed and then harrow it in.

Mr. BUCHANAN. With a disk harrow or tooth harrow, or what?

Mr. CHAPLINE. Usually with a brush harrow.

Mr. BUCHANAN. A brush?

Mr. CHAPLINE. Yes, sir; just cut a brush.

Mr. BUCHANAN. That is not a harrow.

Mr. CHAPLINE. Well, it serves the purpose in the area where it is done. Where we can get a tooth harrow in, it is used.

Mr. ANDERSON. Have you ever tried Johnson grass out there? That will stick if you get it in.

Mr. **Buchanan**. No; Johnson grass will not do unless it is cultivated.

Mr. **Rachford**. It may be interesting to you to know that the results of our artificial seeding tests have shown pretty conclusively that the quickest and the best results in revegetating a range are obtained by allowing the native vegetation to reseed, rather than to attempt artificial seeding at a very high cost.

Mr. **Buchanan**. I think you are eminently correct.

BERMUDA GRASS.

Mr. **Lee**. It is too cold in that country for Bermuda grass, is it?

Mr. **Rachford**. Well, in certain areas at certain altitudes.

Mr. **Lee**. That will stay with you if you can get it in?

Mr. **Rachford**. Yes.

Mr. **Lee**. Have you an improved Bermuda? You mentioned something in your statement further back. Are you experimenting with a new kind of Bermuda? I do not mean in your section of the country, but in a general way something was said about it yesterday.

Col. **Greeley**. I think that was mentioned by Dr. Taylor, of the Bureau of Plant Industry.

Mr. **Lee**. Probably so. I was wondering if they had improved on the old variety of Bermuda grass.

Col. **Greeley**. The problem of securing maximum production on over 100,000,000 acres of very rough range is, of course, one that does not lend itself to artificial methods. The cost would be prohibitive. There have been many times in the Forest Service that they have tried out artificial seeding, and we have done it in these 600 and odd experiments to satisfy ourselves and our cooperators as to what is possible. Our conclusion to date is that it is not feasible to attempt that method of revegetation except possibly on very limited areas of high-grade meadows.

Mr. **Buchanan**. The trouble about these investigations, to my mind, is that they carry along the appropriation for 10 or 15 or 20 years and they never cease. You make the investigations, but you keep on and keep on and keep on. It looks like there ought to come a time when the investigation is through and the appropriation dropped.

Mr. **Rachford**. There are new problems confronting the service in proper management, and all the time new facts are being developed. I doubt if the need for range investigation will ever terminate.

Mr. **Anderson**. It would seem to me like we ought to reach the limit of legislation some time and get all the problems of the universe solved; but we never seem to.

Mr. **Rachford**. We are finding new means all the time of increasing the use of national forest ranges. We are developing better methods of determining carrying capacity, developing better seasons of the use based upon the growth requirements of the plants. We are studying the effect of fires on brush and other vegetation, and the relation of grazing to timber reproduction, the relation of grazing to the maintenance of game, and the relation of grazing to all other Forest Service activities. And this use, increasing as it is, demands, as I see it, increased attention or better attention toward investigations and experiments.

INVESTIGATION OF IMPROVED METHODS OF HANDLING SHEEP.

As a practical result of some of these investigations, the improved methods of handling sheep alone on rugged forest ranges have been extended to about 60 per cent or more of the national forest ranges. That means that about 5,000,000 sheep occupying those ranges have been benefited by the installation of this improved method of management. It has resulted in about a 15 per cent increase in carrying capacity.

Mr. BUCHANAN. What does that include, precisely?

Mr. RACHFORD. It involves principally the open or blanket system of herding sheep. Formerly most of our sheep owners used the old central camp idea, where they would put their central camp down in a nice camping spot and continually return their sheep to that spot night after night for as many as 30 or 40 nights, with the consequence that vegetation had been entirely destroyed for a distance of a half a mile around that bed ground, and often more than that. The open system of herding allows the sheep to camp where night overtakes them.

Mr. BUCHANAN. You need nothing except a little observation or common sense to evolve that method, do you?

Mr. RACHFORD. Perhaps, but it has enabled us to convince stockmen more readily by showing them the actual results and the increase in the weight of the lambs.

Mr. BUCHANAN. I want to say you have very impractical, unobserving stockmen out there.

Mr. RACHFORD. The increase in the weight of the lambs amounted to from 5 to 10 pounds.

As another practical result of these investigations, ranges which have a great quantity of poisonous plants have been made usable. The loss of cattle on these areas was about $55,000, and by the expenditure of $35,000 in cooperation with the stockmen this loss was eliminated.

I think that is all, Col. Greeley.

Col. GREELEY. I would like to put the need for this work in a nutshell, Mr. Chairman, in this way: We have in the national forests about 125,000,000 acres of land that produces more or less forage. Those range lands vary tremendously in their locations, in their climatic conditions, and in their quality. Sagebrush range, low wire grass range in the foothills at the lower edges of the national forests, up to the very succulent ranges in the timber on the mountain meadows. These ranges have never been the subject of intensive study, their use has been governed by the rough and ready methods of the frontier, and in very many cases those rough and ready frontier methods led to the practical destruction of range lands.

As you know, before the National Forest Service was created these were just ranging commons; anybody could use them who could get there first and keep off his competitors with his Winchester; and when the Forest Service took over these ranges we found many of them depleted, many of them entirely destroyed, and many of them had their productive capacity materially reduced. It is merely a practical problem of how much we can make out of those national resources, not only as a matter of revenue, as it is a very material revenue-producing resource, but also as a matter of economic service.

These areas can carry nine and a half million head of stock. Undoubtedly, properly developed, with accurate scientific knowledge to act upon, their carrying capacity could be very greatly increased. At the present time we have demands for the use of these ranges very greatly in excess of what we believe, as far as our existing knowledge goes, can be safely put on them.

Here is a single national forest in Utah which has over 2,000 grazing permittees. Last year the supervisor had to reject 200 applications for new people who wanted to get little herds of stock on that national forest, because he did not know where to put them without the deterioration of the range. That illustrates the need for this item. It is just the practical need of making the most out of this vast resource that has never been adequately studied and developed. It is not like the pasture lands of Iowa or like the pasture lands of well-developed agricultural States. Our great western ranges have been left to take care of themselves; and what we are trying to do with this item is to work out the basic scientific facts for the most remunerative and the most valuable use of those forage resources.

I do not think that an expenditure of $35,000 a year to develop a resource represented by 125,000,000 acres and by the present annual income of two and one-half million dollars is open to very much question. I view it simply as a business proposition of the Government spending a reasonable amount of money to make the most out of this Government property.

Mr. **Buchanan**. It is worth $35,000 a year for one problem alone, and that is the practical problem, to see that no given range is overstocked or understocked, but that it carries its maximum amount of cattle or sheep or whatever live stock is on it without detriment to the range. That, in my opinion, is a practical problem and one that is worth the money and more than the money, because you can destroy a range in a year or two by overstocking it.

Col. **Greeley**. All these investigations bear on that problem, some from one angle and some from another angle.

Mr. **Lee**. Col. Greeley, you have no control over the lands in the Department of the Interior?

Col. **Greeley**. No, sir; none outside of the national forests.

Mr. **Lee**. What is their plan of grazing?

Col. **Greeley**. They have none.

Mr. **Lee**. They just let them run wild?

Col. **Greeley**. It is just a grazing commons that anyone can use.

Mr. **Lee**. I think you ought to be allowed to take over that, too.

Col. **Greeley**. It would be very desirable.

Mr. **Rachford**. May I add that there is an item of $6,650 for supervision and inspection of the work by men with headquarters in Washington, and another of $5,900 for grazing men stationed in the field. That accounts for the entire appropriation.

Mr. **Buchanan**. I would like to ask one question right here, Mr. Chairman. Is there any reason why our pulbic lands, as far as pasture service is concerned, should not be included with these and get some revenue from them?

Mr. **Anderson**. The only reason as far as I know is that Congress has never seen fit to put them under the jurisdiction of the Forest Service. I think they should be put under your jurisdiction.

Mr. **Lee**. That is a point I brought out.

Mr. **Anderson**. It is up to us.

Mr. **Buchanan**. I also think they ought to be under the jurisdiction of the Forest Service.

GRAZING LANDS OF DEPARTMENT OF INTERIOR.

Mr. **Lee**. Do you know in a rough way how many acres the Interior Department has of grazing land?

Mr. **Rachford**. Circular No. 765 of the Department of the Interior gave the figure of 189,729,492 acres of unappropriated and unreserved public land on July 1, 1921. Of this amount approximately 24,700,000 acres have been designated under the 640-acre homestead law, which leaves approximately 165,000,000 acres of unappropriated unreserved public land in the West.

Mr. **Lee**. I think the grazing privilege on that land should be turned over to the forestry people, if there is any way in which it can be done.

FOR PURCHASE OF TREE SEED, ETC., FOR SEEDING AND PLANTING.

Mr. **Anderson**. If there is nothing further on this item, we will take up the item on page 106, for the purchase of tree seed, cones. and nursery stock, for seeding and tree planting within national forests, and for experiments and investigations necessary for such seeding and tree planting.

Col. **Greeley**. I would like to ask Mr. Carter to discuss that item, Mr. Chairman.

Mr. **Anderson**. All right, Mr. Carter; tell us about it.

Mr. **Carter**. The Forest Service is not asking for an increase in this appropriation this year, although there is an apparent increase of $5,000, as pointed out by Col. Greeley yesterday. This is due to the transfer of a special appropriation formerly carried under the appropriation for the Nebraska National Forest. It appears on page 91 of the book before you. That accounts for the apparent increase from $120,640 to $125,640, as given in the estimate.

There are in the national forests not less than one and one-half million acres of denuded land which can be restored to productivity of timber only by planting. This is land which has borne timber in the past, but which by reason of repeated fires has had the timber crop removed from it and is now in such a condition that it will be a long time before a new tree crop starts on it naturally.

During the past years, as previous appropriations for planting have been used, there have been about 100,000 acres successfully reforested. The present appropriation of $125,000 enables the service to reforest about 7,500 acres annually, the exact amount varying chiefly according to the wage scale in the localities in which we are conducting our work. If the wage scale gets high we can not hire as many laborers with the appropriation, and consequently the acreage reforested is less.

Mr. **Magee**. With what do you reforest?

Mr. **Carter**. Chiefly with young trees.

Mr. **Magee**. What kind of trees?

Mr. **Carter**. The native species, almost entirely.

Mr. Magee. Pine?

Mr. Carter. Pine chiefly. In the west coast country, the west slope of the Cascades, we use a great of deal Douglas fir or Oregon pine, as it is called.

Mr. Magee. How many years of growth would it take to produce a tree of lumber size?

Mr. Carter. In that west coast country?

Mr. Magee. Yes.

Mr. Carter. Forty to sixty years will produce a tree that is large enough for use as lumber. They are now logging there in some of the more successful stands of second growth that are not over 60 years old—cutting them for ties and for common lumber.

The point of these figures is that at the present rate it will take us about 200 years to complete the job which is in sight, so that the rate of progress we are making on this problem of restoring these denuded lands to productivity, while as fast as we think we can make it with the present appropriation, is by no means rapid; and certainly the rate at which we are undertaking the job on the basis of the appropriation can not be considered an excessive expenditure for that purpose.

Mr. Buchanan. You never complete the job, because by the time the trees are ready for cutting there would be other areas to be replanted?

Mr. Carter. That depends a great deal on how successful we are in meeting the question of forest fires, Mr. Buchanan.

Mr. Buchanan. And whether or not the judgment day is coming.

Mr. Carter. It is not a question of replanting areas as they are cut off, but it is chiefly a question of bringing back into productivity land which has been burned repeatedly, much of it many years before the land was put into the national forests.

Mr. Buchanan. The probabilities are there will be plenty of areas burned again during that time, and you would never catch up with this appropriation?

Mr. Carter. It will probably be a continuing appropriation.

Mr. Buchanan. I can see that.

Mr. Magee. You have to keep it up, though, do you not? There is a great necessity for it, is there not?

Mr. Carter. There is a real necessity for it.

Mr. Magee. I recall in the late war the French cut spruce trees, for the purpose of getting timbers for airplanes, that were planted by them in the sixteenth century.

Col. Greeley. That is a fact.

Mr. Carter. At the present we are reforesting only these lands which are producing nothing. In the future, after we make some headway on this problem, we may find the most efficient way to keep some land productive is to plant it after cutting instead of depending on natural reseeding. The French do that to some extent. That is a question of local application, however.

Mr. Anderson. According to the figures you have given, it costs about $16 an acre?

Mr. Carter. Approximately that.

Mr. Anderson. What is this stumpage worth when it is 60 years old?

Mr. **Carter**. All depending on the location and what stumpage will be worth 60 years from now——

Mr. **Anderson**. It is not worth more than five or six dollars an acre at the present time, is it?

Mr. **Carter**. In many cases, particularly on the west coast, where we are planting, the stumpage return will run considerably higher than that.

Col. **Greeley**. He said per acre.

Mr. **Carter**. Per acre it might run ten times that amount at present stumpage prices.

Mr. **Anderson**. $6 a thousand; yes.

Col. **Greeley**. Those stands frequently cut 40,000 or 60,000 feet to the acre.

Mr. **Anderson**. Yes; I was thinking in terms of 1,000 feet rather than per acre.

Mr. **Carter**. We have had to discontinue in the past three or four years the work which we have been doing in Arizona, New Mexico, Utah, and California, although there is considerable denuded land in each of these States. Our present work has been concentrated on those areas of more rapid growth or of more urgent necessity for reforestation. Our biggest project is in north Idaho and western Montana. We are spending about $40,000 a year on that project. We have a nursery there with an annual output of between two million and one-half and three million trees, and we are planting about 2,700 acres a year in that region.

Mr. **Buchanan**. Have you been working on this denuded land exclusively since you had this appropriation?

Mr. **Carter**. Practically.

Mr. **Buchanan**. Since 1910?

Mr. **Carter**. About then is when we got under way with it.

Mr. **Buchanan**. You must have planted between five and six million acres.

Mr. **Carter**. No.

Mr. **Buchanan**. Seventy-five thousand acres a year?

Mr. **Carter**. Seventy-five hundred acres. I wish it were 75,000 acres.

Mr. **Buchanan**. Go ahead; I misunderstood you.

Mr. **Carter**. Another project of great importance from the indirect effects rather than the direct effects of timber production, is on the east slope of the Rocky Mountains in Colorado. We have, for instance, around Pikes Peak a very large area which was cleaned out by repeated fires some 50 or 60 years ago. On that we are planting between seven hundred and a thousand acres a year at a cost between fourteen and fifteen thousand dollars. It was a hard project to get started. It took a good deal of experimenting to find out what sort of trees to grow in our nursery to plant there, trees of what ages, and what treatment they should have in the nursery; but I think we have pretty well solved it, and perhaps these photographs of an established plantation at an elevation of about 8,000 feet in granite gravel may serve to show what we are actually accomplishing.

Mr. **Lee**. How far do you put these trees apart when you are planting them?

Mr. **Carter**. From 6 feet apart to as wide as 10 feet apart, Mr. Lee, depending on the site and location.

Mr. **Lee**. If you scatter them, would they not reforest themselves?

Mr. **Carter**. There would be an interval of from 30 to 50 years before those young trees began to bear seed which would be of any vitality.

Mr. **Magee**. What care do you give the ground after you reforest it?

Mr. **Carter**. After we plant the trees?

Mr. **Magee**. Yes.

Mr. **Carter**. Practically nothing except fire protection, until such time——

Mr. **Magee** (interposing). Does underbrush and everything grow up there amongst the young trees?

Mr. **Carter**. The trees usually fight their way through that without any real help.

Mr. **Magee**. It does not smother them out?

Mr. **Carter**. You will see from that photograph that, in the Colorado case, the land is open; there is very little underbrush. In most of these areas which have been burned so badly you will find very little underbrush.

Col. **Greeley**. That is a question of selection of the tree. We select a type of tree that will succeed in that locality in competition with the undergrowth.

Mr. **Magee**. You select the trees that will take care of themselves?

Col. **Greeley**. Yes.

Mr. **Carter**. We have another large project in the sandhills of Nebraska. These were not forest lands, within historic times, at least. The soil is pure sand of great depth. These sandy lands are surrounded by an agricultural region which has to import all its timber, even its fence posts, and which needs a local supply of timber very badly. It took us 10 years of experimenting to find out how to make trees grow there. We really solved the problem about 1912. Before that we could get the trees to live and grow on only a very few limited areas, but since then we have been planting between 600 and 700 acres a year on the Halsey division of the forest and now have over 6,000 acres of growing plantations. I have also here a set of pictures which show the development of those plantations.

Mr. **Lee**. Tell us what kind of soil you put in with the sand. How do you get them to grow? That is the point.

Mr. **Carter**. We plant the trees in the sand without mixing in anything. We grow the trees very carefully in the nursery first, having determined through experiments what kind of trees to plant in that region, and what development of root system especially is necessary in order to give the trees the best chance after they are planted out in the field. Then, as shown in that photograph, we run furrows 8 feet apart in that sand, with a trencher coming behind cutting an additional slit in the sand about 3 inches deep. The roots of the small trees are put down into that trench and a man steps on both sides and breaks in the sand and plants them in that way.

Mr. **Lee**. A sort of subsoil.

Mr. **Carter**. It is all pure sand. The trench gets the roots down a little deeper and protects them a little better against the evaporation of water from the soil.

The work on the Niobrara division of the Nebraska Forest is similar, but has been on a much smaller scale. We have had a special appropriation for the work on that division of $5,000, which has been insufficient to enable us to develop a good standard nursery there and at the same time do any real planting. We have been planting about 160 acres a year there. With this combination of the special appropriation with the regular appropriation we expect to devote about $8,000 to the Niobrara during the next year or two while we are getting our nursery in shape without any great extension in the acreage planted. It takes three or four years to grow trees in the nursery before they are ready to plant in the field.

Mr. **Anderson**. Why has not this proviso been taken advantage of by the residents out there?

Mr. **Carter**. We have been distributing trees to several hundred applicants each year within the district named in the law. Our totals since 1912 are about 1,300,000 trees, distributed among about 6,500 applicants. The law provides for the distribution only of surplus stock, which has tended to hold down the amount we have been able to give to any one applicant. It has varied from 100 to, I think, a maximum of 400 trees in different years, depending on the amount of surplus stock which we had on hand. Some years we do not have much surplus.

Mr. **Lee**. How long would a fence post made of jack pine last out there?

Mr. **Carter**. If it is treated with creosote or other preservative it will last as long as the post from almost any other wood. We do not recommend the use of jack pine for fence posts unless it has had preservative treatment.

JACK PINE.

Mr. **Magee**. What is jack pine?

Mr. **Carter**. Mr. Anderson can tell you a great deal about jack pine. It grows very abundantly in his State. It is a pine tree looking something like the ordinary Virginia scrub pine that grows around here.

Mr. **Buchanan**. It is a scrub, then?

Mr. **Carter**. It is a scrub tree of considerable economic importance.

Mr. **Magee**. For what purpose?

Mr. **Carter**. Some of it for pulp, some of it for common lumber. They make a good deal of lath out of it. In northern Minnesota, a lot of it is used for mine timbers in the iron mines.

Mr. **Buchanan**. How large does it grow?

Mr. **Carter**. It is a small tree growing to 18 inches or 2 feet in diameter.

Mr. **Buchanan**. As high as other pines?

Mr. **Carter**. Well, in the Lake States it frequently reaches a height of from 60 to 80 feet.

Mr. **Anderson**. Full of knots?

Mr. **Carter**. Yes.

Mr. **Magee**. Is it grown in the Northeast, as well?

Mr. **Carter**. It does grow in northern Maine, but not in amounts of commercial importance.

Mr. **Magee**. Where does it get its name "jack" from? Where does it get the name "jack"?

Mr. **Carter**. I can not answer that. It is a tree that will grow in very sandy soil, and in regions of low rainfall. It is not the best tree in the country, but we desire to give Nebraska something, rather than nothing at all.

Mr. **Magee**. It is probably very hardy?

Mr. **Carter**. Very hardy indeed, very drought resistant, and will stand a whole lot more abuse than a good many other trees. Also, it grows well on very infertile sand soils.

Mr. **Buchanan**. Is the reason why you select this jack pine for planting for the Government at $16 an acre because of the character of soil that would not produce anything else but scrubs?

Mr. **Carter**. The character of soil and rainfall out there make that tree the best under those conditions. We are also planting in Nebraska on the better sites—the north slopes, for example—considerable quantities of western yellow pine, getting the seeds from the Black Hills region. That tree grows to a good size timber tree.

Mr. **Buchanan**. That is all right; but I doubt the widsom of planting this scrub pine at $16 an acre.

Col. **Greeley**. Mr. Buchanan, the older plantations of this same species in Nebraska show a growth of in excess of 100 cubic feet per acre per year. Now in that locality, where the prime need is for fence posts, the maximum rate of growth that you could get is the most desirable factor, in our judgment. Of course, where we can make a better tree grow we select a better tree; but just as the jack pine is proving right to-day in Michigan, Minnesota, and Wisconsin to be the natural tree on the inferior sand soils, so on these inferior sand soils of Nebraska we found it the best means of reforestation, and we do not use it where we can make a better tree grow.

Mr. **Buchanan**. I am in favor of reforestation, but we probably have, as you gentlemen know, a great area of fertile land, of lands that will grown real timber, in substantial need of reforestation, and I believe we should begin to use the fertile lands that will produce real timber and reforest them first, instead of starting on the character of land that will not produce anything but scrub, the root of which tree is generally bigger than the top of it—the part below the ground is greater than that above.

Mr. **Carter**. These trees do not answer that description. We are getting some real growth there.

Mr. **Wason**. You take your jack pine 3 feet high, and how long in that Nebraska sand plain will it take to get the average jack pine so it will be 6 inches in diameter?

Mr. **Carter**. The plantations which Col. Greeley just spoke of already exceed that diameter. In fact, they average over 10 inches, and they were planted in 1891.

Mr. **Wason**. How large were the trees when they were planted?

Mr. **Carter**. From 3 to 6 inches high.

Mr. **Wason**. I think I know the variety of pine which you refer to. I think I have some of it, I am sorry to say, that I own. It grows, as you say, on sand soil, but the growth is slow. As timber you can saw them straight usually, but six months after it is sawed a snake could not follow the timber if it happened to be of small size. However, I am not discrediting your work on that very poor soil in western Nebraska.

Col. **Greeley**. The trouble is, Mr. Wason, you are surfeited with very fine trees.

Mr. **Wason**. Sometimes.

Col. **Greeley**. And the situation in Nebraska, with its treeless sandhills, is entirely different.

Mr. **Wason**. I may say for years I have studied or observed—you men in the department would say studied—to find out the real purpose for this jack pine. I have satisfied myself it has one purpose of a little value, that is, to nail a barb wire on; and nailing will not kill it. It does not impair its growth, because you can not note it from year to year. However, I do not want to be considered as opposing it, if you can grow anything in some parts of Nebraska.

Mr. **Carter**. In the Lake States we have the Michigan National Forests, which has been very largely burned over, and where we have a job of planting something like 60,000 acres of land which has been burned so hard before its inclusion into the forest that the only way to get it back to production is by planting. Also the Minnesota forest has some fifteen or twenty thousand acres of the same sort. The work on these two forests is the cheapest per acre there is anywhere in the country, and it is about the most successful. We are able to use smaller stock there than elsewhere. For one thing, the Lake States, of course, have a fairly high and well-distributed rainfall. At the present rate of work it will take about 60 years to complete the work on the Michigan forest, and from 10 to 25 years on the Minnesota forest. We are spending between $10,000 and $12,000 a year in the work on these two forests.

Mr. **Anderson**. Are the States joining you in this work at all?

Mr. **Carter**. Not in the national forests. The States, especially Michigan, are doing a great deal of planting on their own land. They have a great deal of land.

Mr. **Wason**. You mean on State lands?

Mr. **Carter**. On State-owned lands.

Mr. **Wason**. And does the average farmer of Michigan follow the Government or State in that activity on his own lands?

Mr. **Carter**. Some of them are doing some planting. I am not prepared to say to what extent—as to what the average would be.

We have also been trying to reforest some badly burned land in the Black Hills National Forest, in South Dakota and in Wyoming, by the direct sowing of seed without raising the trees in the nursery first. For some reason that region is about the only one where we hav had any real success with the direct sowing of seed instead of th planting of trees in this work of artificial reforestation.

SEEDING COST PER ACRE.

This fiscal year we are reseeding about 200 acres of land in southern Wyoming at a cost of between eleven and twelve hundred dollar We had to suspend work in the Black Hills section about 1916. During the war the price of labor in the Black Hills went very high, an we had to suspend operations there; but we hope to resume, reseeding 500 to 800 acres at an expenditure of $2,500 to $3,000. The biggest item in this particular project is the cost of collecting the seed an extracting it and getting it ready to sow.

Mr. BUCHANAN. That is about $5 an acre?

Mr. CARTER. It comes down to something like that. That is the cheap way to do it whenever it gives sufficient promise of success.

Mr. LEE. Are the seeds so large that you have any trouble with the rats and the mice eating them?

Mr. CARTER. The rodents do pick up a number of the seed, but we have been cooperating with the Biological Survey, learning how to poison them, and so give the seeds a chance to germinate before the rodents pick them up.

In Washington and Oregon we have one of our most successful projects of planting. We are spending about $28,000 a year there. We have a nursery with a capacity of between a million and a million and a half trees, which supplies the stock for planting on the forests west of the Cascades. We are planting between 1,700 and 2,000 acres a year there. One of the largest completed projects that we have is on the Siuslaw National Forest in that region, where we have about 10,000 acres of plantation that are growing splendidly.

Mr. BUCHANAN. Where you plant the seed, is an average of $5 an acre a fair estimate?

Mr. CARTER. If we do not have to sow it for three or four times.

Mr. BUCHANAN. I mean in your experience, is that a fair average?

Mr. CARTER. That is about right.

Mr. BUCHANAN. In your experience, taking into consideration where you have to sow it over and where you do not, what is your average?

Mr. CARTER. Taking it for the region where we do that, we can do it for between $5 and $8 an acre.

Mr. BUCHANAN. All right; $5 and $8 an acre. Now, how much where you plant from nursery stock?

Mr. CARTER. Eight dollars to as high as $20 an acre.

Mr. BUCHANAN. It costs you $16 in Nebraska?

Mr. CARTER. It cost us between $16 and $18 in Nebraska.

Mr. BUCHANAN. That is just the planting?

Mr. CARTER. That includes everything.

Mr. BUCHANAN. I understand. It does not include the cost of raising in the nursery, does it?

Mr. CARTER. Yes, sir; it does.

Col. GREELEY. The whole thing, beginning with the collection of the seed, until the job on the ground is completed.

Mr. CARTER. That is, in giving these figures for the projects, I mean, the entire cost, including the nursery expense, the seed collecting, the field planting and the overhead.

We spend between forty and forty-five hundred dollars a year of this appropriation on investigations. The amounts so expended have repeatedly been saved to the Government through economies that have resulted. As I have already mentioned, we would not have been able to do anything at all in Nebraska had it not been for the experiments we conducted there. Before we start in on any new project we experiment several years in order to find out just what kind of trees, just what class of stock, how old, and of what development, etc., it is necessary to have in order to be reasonably successful, and at the least cost per acre.

Unless there are other questions, I think that is all.

Mr. **Buchanan**. I do not see how you can tell in two or three years what would be really successful in any place. That is not long enough for a tree to grow unless you can find what tree was there.

Mr. **Carter**. If we can pull a tree through the first two or three seasons after it is planted, we feel very confident of its future. The critical period is during the first year or two.

Mr. **Buchanan**. You are not governed by the character of the former tree that was there?

Mr. **Carter**. Yes; we mostly use the native species.

Mr. **Buchanan**. After it is ascertained beyond question that you have a native species that is a good tree and makes good timber, or is a useful tree, there would be no use of conducting two or three years investigation, would there?

Mr. **Carter**. The investigations are to find out how we can handle our work at the lowest cost.

Mr. **Buchanan**. Have you not had lots of experience with that?

Mr. **Carter**. It varies very greatly between different regions. There are always economies possible.

Mr. **Anderson**. If there is nothing further on that item, we will take up the item on page——

Col. **Greeley** (interposing). May I add a word, Mr. Chairman?

The **Chairman**. Certainly.

Col. **Greeley**. Mr. Buchanan, in Germany they have been planting forests for three centuries, and are still making experiments and finding out how to do it. In the United States we have been planting forests for 25 years. Where you have good available native trees, they are obviously the trees to use. It is just a matter of saving dollars and cents. These investigations have paid for themselves many times over. If you find you can cut short of the growing of a tree in the nursery and reduce the cost of that tree when it leaves the nursery, you have saved a good deal. You find you can economize in this and that method and still get good results.

The committee must recognize that in trying to put reforestation on a practical footing in this country we have got to do a whole lot of investigating work, just exactly as they have had to do it in Europe.

I would also like to add a word about this work in Nebraska. With that single exception, we are expending this appropriation. In the areas where the best natural growth occurs, where the soil conditions are the best we have, and where the species of timber have the greatest possibilities. The great bulk of our planting is done in Oregon, Washington, Idaho, Montana, in the Lake States, and in Colorado, where there are trees of very high economic value and where the soil conditions are the very best we have anywhere to work with. That is obviously the rational thing to do.

Mr. **Buchanan**. The soil conditions are not very good on the side of Lookout Mountain.

Col. **Greeley**. Recognizing what the national forests are, it is our policy to select the best sites we have where the growth will be the best. The work was undertaken in Nebraska on account of very strong demand from Members of Congress and from the State, as well as the citizens of the State, that the National Government make a demonstration of what could be done in the matter of reforestation in the Nebraska sand hills, which are now very unproductive, except for limited grazing, and we started in there some 20 years ago to do that, and we believe that the value of converting that type of country to a productive use is very great, even if the products which you produce are not comparable with the pine of the south or the pine of the Lake States.

They are very valuable products for that region, and we have demonstrated that practical reforestation there has been extremely beneficial. I would not advocate spending this entire appropriation or any very substantial part of the appropriation on lands of that type, but as a demonstration of what can be done with a very large stretch of semibarren land in that portion of the country, I feel this work is very thoroughly justified and should be continued.

STUMPAGE.

Mr. **Buchanan**. My criticism of Nebraska is that you spend $16 to $20 an acre to plant out little trees that 60 years from now, even if they were good lumber trees, eliminating the jack pine condition, the whole thing would not be worth over $10 an acre as stumpage.

Col. **Greeley**. Your estimates are very low.

Mr. **Buchanan**. Not according to good pine land in Texas.

Col. **Greeley**. The pine timber of Texas to-day is worth from $4 to $6 per 1,000 feet, and your yield——

Mr. **Buchanan** (interposing). Oh, yes; you are talking about timber. I am talking about stumpage, where a sawmill man buys stumpage and puts a sawmill up and goes and cuts it down. It is about $10 an acre now. It used to be $4 or $5 an acre for all the timber on the land.

Col. **Greeley**. Yes.

Mr. **Buchanan**. That is what we call stumpage.

Col. **Greeley**. Certainly.

Mr. **Buchanan**. And there are thousands and thousands of acres at $3 an acre, and the trees are thick and way up yonder—splendid timber trees.

Col. **Greeley**. But you could not obtain such timber for similar prices now.

Mr. **Buchanan**. $10 now.

Col. **Greeley**. $10 an acre?

Mr. **Buchanan**. Yes.

Col. **Greeley**. For old growth, long-leaf pine?

Mr. **Buchanan**. Yes; for sawmill uses. Of course, the sawmill men will only buy the stumpage, say, from 12 to 15 or 18 inches in diameter and leave the younger trees there to grow.

Col. **Greeley**. I do not want, of course, to dispute your knowledge of conditions in Texas, Mr. Buchanan, but I would like to bring this out: We are cutting a good many areas in the national forests to-day where the yield from stumpage is in excess of $100 per acre.

Mr. **Buchanan**. You have got exceptional forests up there. You have many trees that will make two or three thousand feet of lumber.

Col. **Greeley**. In many cases. Take our forests in the Rocky Mountains, for example; the yield for stumpage is as high as $50 an acre. Take the Black Hills in South Dakota, which is the nearest commercial forest that exists to these Nebraska sand hills, and our average price for stumpage there ranges around three to four dollars per thousand, with a cut of from 12,000 up per acre.

Mr. BUCHANAN. I suppose you are figuring on the high prices of lumber we had a little time ago.

Col. GREELEY. No, sir; I am just taking the average price of the standing timber as reflected in our own business in that region.

Mr. BUCHANAN. For the last two or three years.

Col. GREELEY. Stumpage prices have gradually increased.

Mr. BUCHANAN. I recollect we used to buy lumber at $10 a thousand already sawed. You can not do that now.

Col. GREELEY. I can assure you, Mr. Buchanan, that from any reasonable calculation of what timber is worth in Nebraska, where they have to bring every stick they use from the South or from the West, you can figure out a very handsome profit on this work that the Government is doing.

Mr. BUCHANAN. Well, I would like to be that good at figures.

Dr. BALL. And when you have taken this timber off, your timber is still reforested forever.

Mr. MAGEE. You mean it grows up of itself?

Dr. BALL. Yes; if it is forested properly.

Mr. BUCHANAN. Pine reproduces itself; there is no question about that. All the timber of Texas now has been cut, practically all of it, and it is full of little pines 30 and 40 feet high. It is full of them. It reproduces itself.

Mr. MAGEE. After reforestation if it is cut off the forest will grow up anew?

Col. GREELEY. If it is done in the right way.

Mr. BUCHANAN. If you do not destroy it.

Mr. ANDERSON. Do you want to continue?

FOR TRAINING AND INSTRUCTION OF FOREST OFFICERS.

Col. GREELEY. I would like to add a little to what I said yesterday about this item on page 107, for training and instruction of forest officers necessary for effective protection and administration of the national forests.

An inspection of forest fires, such as the Forest Service makes every year, shows that considerable loss is due to the inexperience and lack of knowledge on the part of forest officers of the right way of handling forest fire work. Mistakes in judgment and mistakes in the methods used have frequently been made, and result not only in loss through damage to the forests, but loss in the necessity for incurring emergency expenditures to make up for mistakes that the men on the ground have made. Such mistakes are comparable to mistakes in handling troops in military operations, and I speak of this because I want the committee to recognize exactly the difficulties the Forest Service is under in trying to better the protection of the national forests.

This fire-protective work can not be supervised by a few picked and experienced men. The work is spread out over an enormous area and is under individual men who are stationed many miles apart. It frequently happens during periods of bad fire conditions, lightning storms, and the like, that 30 or 40 fires will start in the same day on the same national forest. Any one of those fires may prove to be stubborn and destructive and to entail a great loss unless fought with skill and understanding. Every ranger and every guard ought to be qualified to act on his own initiative without waiting for orders or without waiting for the instructions of more experienced and expert men. The man on the spot has got to know what to do and how to do it, and if he does not know those things there is a possibility of a fire getting away and becoming a bad conflagration.

It is particularly important that our permanent ranger force, who must supervise the temporary patrolmen employed during the summer, who must supervise from 5 up to 25 or 30 men in each instance, and who are responsible for instructing the temporary employees in their duties and who are expected to go in person to every bad fire in their district if it is physically possible for them to go—it is especially important that these rangers be trained in the whole subject of forest fire fighting.

The actual fighting of fires after they start is the smallest part of the game. The principal thing that we are emphasizing now in our effort to secure better fire protection is the need for complete preparedness, of having everything planned and provided for, so that the men will know what to do under each contingency and will be equipped with practical working knowledge of the very best that the entire Forest Service has developed.

Now, in bringing our men up to this stage of preparedness to do the right thing in the right way, we have been greatly handicapped by the turnover among our rangers. When one-third of our permanent ranger force quit in a single year, 1920, and green men had to be employed to fill those vacancies, it was inevitable that a good many mistakes would be made, that a good many of these new rangers, notwithstanding their conscientiousness and loyalty, did not know what to do, and fires became bad fires that experienced men would have gotten under control with very little labor and very little cost.

It is only occasionally that new men can be hired who are experienced in fire-protection work, and very many rangers in their individual work fail to learn important features of efficient fire control. Their own experience is too limited, and many rangers have individual tendencies or prejudices that have to be overcome. They think they know how to handle fires when, as a matter of fact, they do not. They need to be trained and taught. And the purpose of the service in asking for this item is to be in a position to instill into all of our field men the best practical knowledge that our whole experience has developed in the handling of fire equipment, in all steps of preparedness and in the actual organization and methods of fire fighting.

The Forest Service has tried for a good many years to provide this training as best it could. Of course, many individual rangers are instructed by their supervisors, and in many cases experienced old hands on National Forests have worked with the new men and broken them into the game of fire fighting. We have frequent ranger meetings on individual National Forests where fire methods are discussed and experiences compared, and we have conducted correspondence courses during the winter from the district office, trying to reach as many rangers as possible through that method, but we have not been able to accomplish the training that is necessary as completely and as thoroughly as is needed. And next to building up the size of our protective force I feel that some provision for systematic training is of the greatest importance in the whole work of fire protection.

Mr. BUCHANAN. Generally and shortly, what does your fire equipment that you want to train them in the use of consist of?

Col. GREELEY. The rangers need to know thoroughly the equipment on the lookout stations, how to handle their range finders, which are used to locate fires; they need to learn how to read maps——

Mr. BUCHANAN. Do they use glasses, or just the naked eye?

Col. GREELEY. Occasionally we furnish them with binoculars; but the average ranger depends on the natural eyesight.

Mr. BUCHANAN. And when they see smoke they learn how to locate it?

Col. GREELEY. Yes; and how to find it.

Mr. BUCHANAN. Where do you have to look from? Do you have towers?

Col. GREELEY. Wherever peaks give a sufficient outlook over a region, we use them; but where there is no sufficiently high natural point to give an outlook, we construct a tower either made out of tree trunks, or a steel windmill tower. We put a little inclosure on the top of it with a little ribbon of glass around, install the ranger there with his map and range finder—and every ranger has to be a telephone operator and know how to keep up and operate the lines in his district. He has got to know the inside of a telephone and how to locate troubles, how to keep the telephone up during fire seasons. There is a good deal also in the use of fire-fighting tools. We are trying to improve them all the time. We are using hand pumps and that sort of thing where it is practicable to use them. Then there is the organization of a fire crew, how to fight fire, what side to tackle it on, under what conditions you can go right in and beat it out, and under what conditions you have got to drop back and start a back fire—and there are a great many tricks of that sort that, taken altogether, make up a rough and ready science of fire fighting, if you want to call it that, which has been developed through our experience, and we want to get that knowledge into the heads of every one of these men.

Now I do not think there is any question as to the authority to do this work that is proposed to do here, but I want to refer to a little past history in this matter, because it may come up. In 1910 the former chief of the Forest Service made arrangements under which a number of rangers from several of the western districts were sent to local State schools for short courses of instruction. Their salaries were paid by the Government during this period of instruction. Now that came before the Comptroller of the Treasury and that expenditure of Government funds was held to be illegal and the proposition was terminated before it had been completely carried out.

The work which we are now proposing to do is entirely different from that. What we will do under this item will be to assemble from 30 to 40 year long rangers in each of the four national forest districts where the fire problem is most serious, at some ranger station where the existing buildings will be used, supplemented by tent camps, and those men will put in, at the time of the year when the work is most slack, about six weeks under the instruction of regular members of the Forest Service, picked out as the most experienced men in fire work. They will be actually working on National Forest work, and getting instruction in fire fighting by demonstrations and lectures, practical building of telephones, the practical building of lookout stations, and making up maps, and that sort of thing. The money will be used very largely, almost wholly, to pay the cost of assembling these rangers at the central camps, and we will maintain under the appropriation probably four of those camps.

As I view the matter, the Forest Service has adequate authority under existing legislative items to do this very thing. It is part of the job of protecting the national forests from fire. The item is, in fact, a very frank request for an increased approrpiation to carry on a line of work which is already authorized but for which we now lack sufficient funds. I would not feel justified, for example, in taking $20,000 out of the appropriation made for the national forests and using it for this purpose without the sanction of Congress; and, consequently, I have asked the Bureau of the Budget and now ask the committee to consider the matter as a special item.

That is all I have on that, Mr. Chairman, unless there are some questions.

Mr. ANDERSON. Are there any questions?

Mr. MAGEE. I notice you have there proposed language, the words, "and administration." I do not suppose it would lessen the force of the provision any if those words were omitted?

Col. GREELEY. No, sir; it would not lessen the proposal for fire protection. We, of course, are going to take advantage of the assembling of these men in these groups to give them some instructions in the form of lectures on administrative work. We could do that anyway. I do not think there would be any question as to the authority for doing it.

FOR SILVICULTURAL, DENDROLOGICAL, AND OTHER EXPERIMENTS AND INVESTIGATIONS.

Mr. ANDERSON. All right, Col. Greeley, you may take up the next item, page 108.

Col. GREELEY. I will ask Mr. Clapp to discuss that item.

Mr. CLAPP. Mr. Chairman, this is another research item. It is the item from which our forest experiment stations are supported.

The general purpose of the forest experiment stations is to perform the same function in relation to timber growing that the agricultural experiment stations do for agriculture and the growing of farm crops. They are to secure the technical and scientific basis for reforestation, and for the protection and growing of timber. There is a clear-cut distinction between the work of these stations and the work of the forest products laboratory. The stations find out how to grow timber and the work of the laboratory is to find out how to utilize the timber effectively.

The more we know about the timber situation in the United States and that in other countries the more we realize that we are coming to the proposition of growing the timber to meet our own requirements.

We are now using in the neighborhood of twenty-four and one-half billion cubic feet of timber each year in the United States. The significance of this figure will be a little more apparent if we compare this use with the use in other countries in the world. As far as lumber is concerned, we utilize more than half the lumber produced in the whole world. We produce 35 per cent of the pulp wood of the entire world; we manufacture more than half of the paper of the entire world. Leaving out fuel wood, for which there are no satisfactory figures available, the consumption of wood in the United States is probably about one-third that of the entire world.

Adding to the twenty-four and a half billion feet which we consume another billion and a half cubic feet which is destroyed by fire, insect infestations, and things of that sort, the drain on our forests each year is in the neighborhood of 26,000,000,000 cubic feet. We are growing, however, only about 6,000,000,000 cubic feet, or less than one-fourth of this amount, and we have got sooner or later to make up the difference. Using our present acreage of forest lands, this means growing more than 50 cubic feet on the average for every acre of forest land we have.

This is more than they have ever produced in the intensively managed forests of Germany, on the average. To produce this amount we have got to practice intensive forestry. The only way we can get the basis for this intensive practice is through the work of our forest experiment stations.

The past few years have given us an idea of what it means to go without the timber we need. In 1906, taking lumber, for example, our per capita consumption in the United States was 550 board feet. At the present time it has dropped to about 300 board feet per capita, and taking the housing situation, for instance, delayed repairs and construction of all kinds, it is evident that we are not now using as much lumber as the country needs.

There is every indication that this per capita consumption will fall off further. Our lumber cut is falling off; our population is growing.

I would like to approach the forest experiment station question from another standpoint, to give an idea of its size. We have some 80,000,000 acres of forest lands in the United States to-day, which are practically unproductive, growing practically nothing. In addition there are in the neighborhood of 245,000,000 acres which are covered with second growth, only a part of which is producing what the land ought to produce, and a large part of which is producing only a fraction of what the land ought to produce. We have left out of our original forest area of 822,000,000 acres about 137,000,000 acres of virgin timber.

Mr. BUCHANAN. Do those figures include all the forest land, Government or otherwise?

Mr. CLAPP. Yes, sir; both privately owned and Government land. We ought to cut the remaining virgin land in such a way that we will get natural reforestation, so we will not have to replant those lands. The total acreage of the forest lands made up of these items is 463,000,000 acres. That is only about 15,000,000 acres less than the total of improved agricultural land, as shown by the 1909 census.

Mr. ANDERSON. In the estimate that you have given of 6,000,000,000 cubic feet per year production, does that take into consideration the second growth on this 240,000,000 acres that you are talking about?

Mr. CLAPP. Yes, sir; on all forest lands. Our total area of forest land is twice that of the forest lands of all European countries, except European Russia. European foresters have to deal with about 30 species of forest trees, of which only 7 are of the first importance. We have several hundred species, with probably 150 of importance, comparable with the 7 that European foresters have to deal with.

Our conditions vary from the spruce forests of the Northeast to the semitropical forests of Florida, to the semiarid forests of the Pacific southwest, and finally to the rapidly growing Douglas fir forests with the very heavy rainfall in the Pacific northwest, a very great range of conditions.

For the solution of the problem of timber growing connected with this great area of forest land, this wide range of conditions, this large number of forest trees, we now have only three forest experiment stations which are worthy of the name.

There is one in the southern pine belt which was opened the 1st of last July, a second in the Appalachian hardwood region, and a third in the northern Rocky Mountain region. In each of several of the other western regions, the central Rockies of Colorado, the southern Rockies of New Mexico and Arizona, California, and the Pacific northwest, we have a single technical man on work of this character. In several important forest regions we are not now able to do any work. That is true in New England and the Northeast, in the Lake States, and in the Allegheny Mountain region of Pennsylvania and the surrounding territory.

Mr. ANDERSON. How much money does it take to establish a forest experiment station on a reasonably efficient basis—how much annual expenditure?

Mr. CLAPP. For the most important forest regions I should think we ought to have to conduct the work on the proper scale from $40,000 to $50,000.

Mr. ANDERSON. For each station?

Mr. CLAPP. Yes, sir.

Mr. WASON. What is the custom in each of the States that you have referred to, those that you have established, or what is the annual expense at each of the stations you have just referred to?

Mr. CLAPP. The amount that we have available for these stations is very much less than $40,000 or $50,000. For the southern experiment station the allotment this year is $14,159.51; for the Appalachian Forest experiment station the allotment is $18,388.31; for the Priest River station, in the northern Rockies, the allotment is $12,000.

Mr. BUCHANAN. Where are the three principal stations located?

Mr. CLAPP. The headquarters for the Appalachian station is Asheville, N. C. The present headquarters for the southern station is New Orleans. The headquarters for the northern Rocky Mountain Forest experiment station is Missoula, Mont.

Mr. ANDERSON. Is it the desire to scatter the stations around?

Mr. **Clapp**. I think, Mr. Chairman, that we ought eventually to have a forest experiment station in each of our principal forest regions. We have to go to the woods to solve these problems. We can not carry the problems to a laboratory, as we can problems of wood utilization. For example, if we want to try out methods of planting we must use the species in the region we are studying, and plant under the conditions in that region, or the results will not be good.

The remainder of the present appropriation carried by this item is allotted as follows:

For work in Colorado and the central Rocky Mountain region, $6,120; for work in New Mexico and Arizona, $4,884.20; for work in Utah and southern Idaho, $2,170; for work in California, $5,675; Washington and Oregon, $3,120; for work in Washington, D. C., $18,482.98.

The work in Washington consists in the supervision of the entire work of the forest experiment stations, of identification and studies of the characteristics and distribution of our forest trees, of the compilation of a very large amount of data on measurements of growth and yield, the compilation of data on the forest resources of other countries, and finally of advice and assistance to farmers who practice forestry on their farms.

The work of the Priest River Forest Experiment Station in the northern Rocky Mountains consists of studies of reforestation; of studies of the best methods of brush disposal, which is a critical problem, because of the large amount of brush and débris left after logging operations, and the effect of methods of disposal on natural reproduction following lumbering.

Mr. **Anderson**. To what extent are you able to control, or to what extent do the private owners conform to the conclusions of the Forest Service with respect to methods?

Mr. **Clapp**. The principal application, up to the present time, has been on the national forests, and the great bulk of our work prior to the 1st of July of this year has been in the West, in order to supply the information which we needed in national forest administration.

There is a rapidly growing interest, however, on the part of private owners, in the results of work of this character, and there is a growing application of the results.

I can not give definite figures as to the number of owners, or the areas on which they are applied, because it has never been compiled.

Mr. **Wason**. That refers particularly to the western portion of the country?

Mr. **Clapp**. The principal work has been done in the West, but in years past we have done some rather general work in the East, and probably the greatest interest now on the part of private owners in the results of this work is in the East.

Mr. **Anderson**. I have an impression that the greatest deterrent to reforestation, probably to the best method of logging off lands, is the present tax situation?

Mr. **Clapp**. It is a reason which is very frequently given by owners for not practicing forestry. There is no question about it. I believe, however, if we were able to furnish to private owners authoritative data on methods of reforestation and if at our experiment stations we could have actual demonstrations of successful methods, there would be a great stimulus to private own

Mr. **Anderson**. But the pocketbook nerve is the most sensitive.

Mr. **Clapp**. In some cases, for example the pulp industry, the situation is rapidly developing that the owners will have to grow timber to supply the plants in which they have large investments. They have been purchasing large amounts of timber in the northeast and they have been particularly dependent upon Canadian sources.

Mr. **Anderson**. They will take care of that pretty well in their depreciation.

Mr. **Wason**. Are they practicing it on devastated land?

Mr. **Clapp**. I think they are beginning to be very much interested.

Mr. **Wason**. Interest and practice do not mean the same thing to me. Now, with that suggestion, can you answer my inquiry?

Mr. **Clapp**. In individual cases I would say that they are making crude attempts.

Col. **Greeley**. There are half a dozen large companies which have started upon the reforestation of their lands, paper companies. One is in Louisiana and the other is in northern New England and northern New York. There are a number of others in the interest stage, but they have not done anything. There are a considerable number of lumber manufacturers who have definitely undertaken the reforestation of their lands. The proposition is gradually spreading. In a great many cases the tax situation is blocking it. In much of New England, for instance, the tax assessors recognize the necessity for low taxes on restocking lands, and the taxes are so low there is no serious burden, but in other cases the tax proposition blocks the reforestation.

Mr. **Wason**. Will you furnish me that information about New England?

Col. **Greeley**. As to the tax situation?

Mr. **Wason**. Yes.

Col. **Greeley**. Yes, sir. I was introduced last summer to the tax assessor of one of the townships in northern New Hampshire, who discussed that question with me, and had the whole proposition worked out, the necessity for moderate taxes on cut-over lands.

Mr. **Wason**. That man trebled the taxes on a certain timber lot in Grafton County, and the valuation which he ordered the man in the town to put on that lot was 40 per cent more than the owner received when he sold it right afterwards. You refer to Mr. Aime, of New Hampshire.

Col. **Greeley**. No, the town assessor.

Mr. **Wason**. Well, he is a selectman.

Col. **Greeley**. Yes.

Mr. **Wason**. I do not know anything about him. He is the figurehead, as compared with the tax commissioner. You want to get at the source of the evil.

Col. **Greeley**. I would also like to add, Mr. Chairman, that there is a rapidly growing demand for information from the States. For example, the State of Oregon has a compulsory law which requires lumbermen to dispose of their slashings, and they have asked the Forest Service to advise them how that law should be applied in regions of the State. The development of State forest activities is one of the things bringing to the front this need for information.

Mr. **Clapp**. The statements which I have given concerning work under way illustrate fairly well the work which is being done in all the different regions, at all the forest experiment stations. I can go into detail if the committee desires.

No request has been made for an increase in this appropriation during the coming year. It is probable that the allotments will be substantially the same next year as they are this year as between the different stations and regions.

Mr. **Anderson**. There have been one or two bills, perhaps more, introduced which contemplate the establishment of forest stations in various sections of the country, particularly one I think in the Lake region. Do you care to discuss that?

Mr. **Clapp**. The history of the Lake States as a lumber-producing region is so recent that it is pretty well understood; there are just a few figures bearing on it, which I would like to mention, however. The maximum production of white pine lumber in the year 1892 was in the neighborhood of 9,000,000,000 board feet. Up to this time the Lake States had supplied the great lumber markets of the Middle West and the East. Lumber even went into the South, and as far west as Denver. Production in 1921 had fallen to approximately 1,000,000,000 board feet.

The cut of Michigan, which for 25 years was the leading lumber producing State in the United States, was in the last report (I am speaking still of white pine) less than half of the cut of white pine in the State of Massachusetts.

Wisconsin, which led the country in lumber production in 1900, produces less white pine lumber now than either Maine or New Hampshire. Wisconsin consumes some 800,000 cords of pulp wood each year, and one-third of that comes from outside of the State. The forest area of the Lake States is in the neighborhood of 46,500,000 acres. Of this the best information we can get indicates that 20,000,000 acres are idle land. One of the great problems is the reforestation of that enormous area.

Mr. **Anderson**. How large is the remaining uncut acreage?

Mr. **Clapp**. I think it is very small, except for the hardwoods. Some of the hardwood areas have not been cut over except for white pine. White pine has been taken from all of the hardwood sections.

Mr. **Anderson**. There is still some white pine in northern Minnesota.

Mr. **Clapp**. It is relatively small. I can not give the exact acreage.

Col. **Greeley**. About 300,000 acres in private ownership, aside from the Indian Reservation.

Mr. **Lee**. Where?

Col. **Greeley**. In northern Minnesota.

Mr. **Anderson**. That represents about a 15 years' cut.

Col. **Greeley**. Something like that.

Mr. **Clapp**. The Lake States, which for many years supplied a large part of the country, are as a whole barely self supporting, and within the next 10 years promise to be net importers.

Already lumber in large amounts is coming into these States from the South and the Pacific Northwest.

One of the principal problems is lands now producing no timber. Another question is to increase the production on some 26,500,000 acres which is growing very much less than it should.

Some of the trees in the Lake States, the jack pine for example, promise to be very much more valuable in the next 15 or 20 years than they are now. A great many pulp concerns, as well as the forest products laboratory, are doing work on using jack pine for pulp, and sooner or later a satisfactory method will be worked out, and jack pine will become an important and valuable tree.

Mr. **Anderson**. I understand a good deal of this slashed over land is growing up to white birch and poplar, resulting in enormous fire hazards, and representing quite a problem.

Mr. **Clapp**. Yes.

Mr. **Anderson**. Can you tell us anything about that?

Mr. **Clapp**. There is a large area of that character. I should not confine the fire problem to those areas alone. The fire problem of Lake States is an exceedingly serious one. There is a good deal of work which a forest experiment station could do, looking toward improved methods of fire protection, and that is one of the problems that should be given a good deal of attention.

Mr. **Anderson**. Do you have any idea that the establishment of a station in the lake region would accelerate reforestation?

Mr. **Clapp**. I think that it unquestionably would.

Mr. **Wason**. Could you do it with the amount of appropriation asked for here?

Mr. **Clapp**. No, sir; we are now doing no work.

Mr. **Wason**. Could you with the appropriation asked for in this estimate?

Mr. **Clapp**. $85,000?

Mr. **Wason**. Yes, sir.

Mr. **Clapp**. No, sir; we could not.

Mr. **Anderson**. Is there anything further?

Mr. **Buchanan**. Yes, sir. You say you conduct the experiments in testing out jack pine as being suitable for pulp?

Mr. **Clapp**. That is being done at the forest product laboratory.

Mr. **Buchanan**. Do you do any work for wood utilization?

Mr. **Clapp**. At the forest product laboratory.

Mr. **Buchanan**. What do you do at your bureau?

Mr. **Clapp**. One of the things is experiments in nursery practice, and the sort of things that Mr. Carter referred to in connection with the plant——

Mr. **Buchanan**. You mean the manner of making a nursery?

Mr. **Clapp**. Growing nursery stock.

Mr. **Buchanan**. Do you do anything else?

Mr. **Clapp**. We determine the best season of planting different trees in different regions; in other words the whole basis for artificial reforestation.

Mr. **Buchanan**. Let me show you what this book shows. On page 47 (which might not be included in it) we make an appropriation of $81,000, investigation of diseases in trees. You have nothing to do with that?

Mr. **Clapp**. No, sir.

Mr. **Buchanan**. Not at all?

Mr. **Clapp**. No, sir.

Mr. **Buchanan**. We will skip that—on page 102; it seems to me that there is too much investigation. We made an appropriation of $150,000 for the purchase and maintenance of field office and laboratory supplies. As I remember the testimony, that is merely for forest management and investigating exclusively?

Col. GREELEY. Just a moment. That item does not apply to investigation. That is a supply item for the Forest Service.

Mr. BUCHANAN. If I remember the evidence, it is for the management of the Forest Service?

Col. GREELEY. No, sir; it is for the maintenance of the national forest officers, fire work. It is possible that certain items of equipment for the laboratory have been purchased from time to time, but the great bulk goes into administrative equipment for the national forest.

Mr. BUCHANAN. It is not a research item?

Col. GREELEY. No, sir; not at all.

Mr. BUCHANAN. On page 103 we have $340,000 investigation, etc., which is broad enough to include the proper uses of all characters of timber.

Mr. CLAPP. That is used for the support of the forest products laboratory.

Mr. BUCHANAN. For the forest products laboratory?

Mr. CLAPP. The utilization laboratory.

Mr. BALL. Paper making, pulp and fibers.

Mr. BUCHANAN. On page 106.

Col. GREELEY. Planting.

Mr. BUCHANAN. Tree planting in national forests? Investigation necessary for such seeding and tree planting. That is evidently included in yours?

Mr. CLAPP. The great bulk of that appropriation is used in actual raising of nursery stock.

Mr. BUCHANAN. It says "For experiment and investigation necessary for seeding and tree planting."

Mr. CLAPP. A small part of it is used for investigation.

Mr. BUCHANAN. This is so broad that we can not tell whether it is duplication or not, but it remains at $645,000, and seems to be devoted to investigations in the Forest Service.

Col. GREELEY. Mr. Buchanan, let me make that perfectly clear. As a matter of fact you passed by one item for range investigation.

Mr. BUCHANAN. That range investigation is an entirely different line of investigation.

Col. GREELEY. There are three investigative items in the Forest Service carrying these appropriations—the forest products, wood distillation, etc., $340,000; the range investigation, $35,000; and the item which Mr. Clapp is discussing silvicultural investigations, is $85,000. Those three total a little over $450,000, which is appropriated for investigative work.

Mr. BUCHANAN. There is $440,000 in one?

Col. GREELEY. Not for the Forest Service work.

Mr. BUCHANAN. Yes; the laboratory.

Col. GREELEY. No, sir; $340,000 is the total for the laboratory.

Mr. BUCHANAN. I suppose I put that down wrong. I made a mistake. On page 106, do you mean to say that does not cover investigations—"and for experiments necessary for seed and tree planting"?

Col. GREELEY. It is true that certain small portions of that fund have been used for investigative purposes. The language permits it, but there is overlapping between the language of that and on page 108. The great bulk of the money on page 106 goes in planting on the denuded lands.

Mr. BUCHANAN. That may be, but I contend that from the words of the appropriation you could duplicate the work in each bureau. One could duplicate the work of the other—in the departments of the bureau.

Mr. CLAPP. I can assure you, Mr. Buchanan, there is no duplication in work.

Mr. BUCHANAN. Then the language is meaningless, and not intended to be operated under.

Mr. BALL. That is intended to cover the broad scope.

Mr. BUCHANAN. Silviculture is timber growing, is it not?

Mr. CLAPP. Silviculture is timber growing; yes, sir.

Mr. BALL. It includes the life history of the tree, what climate it is adapted to, and what relation one tree would have to another. The forests are made up of different kinds of growths.

Mr. BUCHANAN. Do you have a laboratory?

Mr. CLAPP. No, sir.

Mr. BUCHANAN. Not at all?

Mr. CLAPP. No, sir.

Mr. BUCHANAN. How do you investigate—read books on trees?

Mr. CLAPP. Investigation is done primarily in the woods.

Mr. BUCHANAN. Do you mean going out in the woods and reading upon history?

Mr. CLAPP. This method would be followed: Seedlings of which the history is very closely known, would be planted. They come from seeds which are collected and planted in a nursery and are grown there and then planted in the field. Then from time to time the men from the forest experiment station look these trees over and find out how may are still alive, how many have died, and determine what are the causes for the losses, and by having a series of investigations of that character, illustrating the different methods, they can eliminate the unsuitable methods and demonstrate the suitable methods.

Mr. BUCHANAN. What do they do then? Do they issue a pamphlet?

Mr. CLAPP. Yes; and the results are made available for national-forest practice. They are put into immediate effect.

Mr. BUCHANAN. Then your bureau has issued a good many pamphlets, has it not?

Mr. CLAPP. Yes, sir.

Mr. BUCHANAN. Since 1912?

Mr. CLAPP. Yes, sir.

Mr. BUCHANAN. So this information is not only for Federal service but for the forest owners generally?

Mr. CLAPP. Yes, sir.

Mr. BUCHANAN. That is all.

FOR AIR SERVICE FOR DETECTION OF FIRES IN FORESTS.

STATEMENT OF WILLIS C. HAWLEY, REPRESENTATIVE IN CONGRESS FROM THE STATE OF OREGON.

Mr. HAWLEY. I appreciate your courtesy, Mr. Chairman, in allowing me to say a few words.

I appear on behalf of the Oregon Forestry Association, the State Forest Service, and individual owners who have formed an association to protect their timber in Oregon, in support of any appropriation you might think wise to make, as large as may be possible, in support of the air service for the detection of fires in the forests.

I have talked with a number of the large owners of timber, with the State forester, and have had considerable correspondence otherwise, and they say, in their judgment, there is no more effective method of detecting a fire early in its origin and getting it extinguished before it spreads very far. They laid special stress upon fires orginating after thunderstorms or heat-lightning thunderstorms, and from the carelessness of hunters who are not accustomed to the woods.

The Forest Service and the State association and the State service all cooperate with the Forest Service very pleasantly, so far as I have heard.

The Forest Service has these stations on the high points, and they have as many as they can establish with the force provided by this appropriation. The mountains there are very high, and covered with dense growths of timber, and the ranges are intersected with spurs that run at right angles to the main line, and a fire may originate so that a man on lookout may not be able to discern it until after it has had some time and gotten some impetus.

If there is any mist in the air, or any previous fires have left a haze in the atmosphere, an aviator flying above can look down, and he looks through a less thick bank of smoke or fog, and can see an incipient fire, and get the word to the nearest place where they can send out to fight it in a comparatively short time; and where there is a suspected area of fire that might originate after a thunderstorm, they can send out a scout to make an investigation to see if any fires have resulted.

On the west side of the Cascades the underbrush is very thick, and it has grown there for no one knows how long, and in the Coast Range it is heavier than in the Cascades. I have hunted at both of those places.

On the Coast Range there is a bush that bears berries that grows on a long stem, and gradually grows up to the light. When we were on a survey we used to blast our way through these patches of bushes: where the timber was not very heavy it was 20 feet high, and underneath was a great mass of dead twigs and stems. If a fire gets in there, the wind that that fire itself generates makes that fire travel with a great velocity. If they can reach it quickly they can head it off much more—with a great deal of effectiveness and greater ease than when it is spreading over a large area; and the longer a fire burns it is harder to fight, because it generates its own breeze.

I was standing on the hurricane peak on the watershed one day and I saw a fire apparently start on the lower part of a hill about 2 miles from where I was. It gradually got along and started up the other side. I went off around to another point, and when I got on the high point to see, that fire had gone up the side of the mountain and was gradually growing in vigor and spreading; and within half an hour it was charging up that hill like a hurricane. It could not be stopped until it got to the crest of the hill.

So I think the money expended in Air Service is as well spent as money can possibly be, any money that is appropriated.

Mr. **Anderson.** The continuance of that service is much more dependent on what the committee have to do with the War Department appropriation.

Mr. **Hawley.** I understand so, but I ask your courtesy to say these words to you on this subject, because the protection of our timber is a matter of great concern; that is, not only on the forest reserve, but that on other lands.

FOR ESTIMATING AND APPRAISING TIMBER AND OTHER RESOURCES.

Mr. **Anderson.** Col. Greeley, your next item is on page 109, estimating timber and other resources.

Col. **Greeley.** This item is used exclusively for the survey of the physical resources of the national forests, with a view to increasing their use. Much work of the same character is done currently by the administrative officers on the national forests, and it is part of their duty to examine areas of timber where applications for purchase are received, without slighting the daily administrative and protective work. As far as they can they make the estimates and surveys of resources which are required before making new sales, or issuing new permits, but the requirements of daily administrative work, and particularly of the protective work during the summer months, are such that it is not possible for the force regularly employed on the national forests to keep pace with the demands for timber and other resources which are being made upon us.

For example, in addition to the increased sales business, to which I have referred in a previous statement before the committee, there are many pending inquiries for large areas of forest timber, which represent probable sales in the course of the next three or four years, if the Government is prepared to put this timber on the market.

But before we can put lots of timber upon the market we must have accurate information of the quality and the quantity of the stumpage, of the conditions surrounding its exploitation, and particularly of its quality. For example, within the past two weeks a gentleman came to Washington representing interests in Oregon, with a very insistent demand that 800,000,000 feet of timber in central Oregon be immediately offered for sale, and they volunteered to pay a price of $1.50 per thousand for that stumpage. This block of timber covers approximately 120 sections in one of the national forests. At the amount offered by these parties the upset value of that timber amounts to $1,200,000, but that stumpage may easily be worth two or three times as much as has been offered for it, and it is obvious that before the Forest Service can advertise that stumpage and put it up for sale we must have a reasonably exact inventory of just what this area contains, its accessibility, its commercial quality, and consequently of its value.

Appraisals of this character are necessary both to secure the data which prospective operators need and also to secure a fair price for the timber, as a return to the Public Treasury. That example in Oregon illustrates some 14 or 15 pending cases, where large quantities of timber are desired, and where the necessity has been created for the Government to make surveys of the character indicated in this item, if it is to take on the increased business and extend the use of the national forests.

Mr. ANDERSON. Is this timber all appraised before it is sold?

Col. GREELEY. Yes, sir; we have found, as a matter of practical experience, that it is not advisable to offer any timber for sale until we have obtained a reasonably accurate estimate of it. We not only need the estimate of the quantity, but the appraisal of the quality, and consequently of the commercial value.

The law governing timber sales requires that the Forest Service appraise the market value of this stumpage and then advertise the timber at that appraised rate for such competitive bids as may be offered. We have been conducting these cruises and appraisals for the past 8 or 10 years.

The national forests contain approximately 80,000,000 acres of merchantable timber, and to date approximately 20,000,000 acres, or 25 per cent of the total, have been covered by examinations of this character. With the appropriation as herein provided, of which approximately $62,500 are expended on timber examination, we are extending our surveys at the rate of approximately 400,000 acres per year.

Mr. ANDERSON. Let me ask you what the value of a survey is, made long ago in advance of a sale.

Col. GREELEY. If a survey is accurately made, Mr. Chairman, it is sufficient for any sale that will come up within the ensuing 20 years. The survey is just an accurate map of the topography of the area showing the drainage courses and mountain ranges and the topographical factors which affect methods of logging; secondarily, it gives us the estimated quantity of timber, which in the case of these mature virgin forests does not change very much from year to year until the area is cut over. It gives us the timber-type conditions, which determine how the stumpage should be cut, what methods of cutting should be required in a contract, and it also gives us the information necessary as to the quality of the stumpage, which has a very important bearing upon its value. For example, you take any timber belt like the Douglas fir region of western Oregon. The difference in the quality of the timber on different tracts as between stumpage that represents clean, mature growth that has not yet reached the point where serious defects have come in and stumpage which has become defective and in which there is a large per cent of cull, there may be a difference of $1 to $2 a thousand feet in value because of the differences in quality wholly aside from the other factors affecting value.

The most important project during the past year—and the same will be true of next year—has been the survey of pulp-wood areas in the forests of Alaska. Over $20,000 were expended upon that for the last fiscal year, and the project for the coming season will require $18,000. The paper business is just in its beginning in Alaska, but we have an opportunity there to develop a very satisfactory industry for the utilization of the timber in the national forests, and also for the supplying of the paper markets of the country with an important commodity. We have about six pending applications of varying degrees of certainty and responsibility—some of them doubtless do not represent bona fide offers and some do—for areas of pulp timber in Alaska; and this survey is being made to definitely locate the most feasible tracts, and secure the data concerning them, which the prospective paper manufacturing companies require on their part, and which the Government requires in drafting the contracts of sale and determining the price.

The other projects which are conducted under this item of timber surveys cover the more important areas of commercial timber in the national forests on the Pacific coast, where there is a large growing business in national forests sales from operators who wish to install new sawmills and open up new regions.

We have also several pending applications in southern Wyoming and northern Colorado for the sale of considerable areas of tie timber from the Rocky Mountain pine, which furnishes the standard ties for the transcontinental railroads, which are using this local source of tie timber to a more and more material degree.

We have also an application for the development of the Superior National Forest in Minnesota for the extraction of pulp wood. That forest in north Minnesota has been regarded more or less as a regrowth proposition. It was very badly burned by fire in earlier years, before the national forests were established, and the greater part of its most valuable timber has disappeared; but the development of the pulp industry in the northern lake States has brought these so-called inferior species, aspen, jack pine, etc., into demand, and we now have a responsible application from manufacturing concerns for the development of that forest for the cutting of pulp wood, and there is prospect there of establishing a satisfactory industry; and that is one of the projects which figures in our current work.

Aside from the survey of timber resources which consume $62,500 out of this fund, we are conducting surveys of the national forest ranges, to an aggregate of $37,500 annually, on the areas where the grazing use is most intensive.

We have probably 125,000,000 acres of land in the national forests which produce greater or smaller quantities of forage. Up to the present time we have been able to cover approximately 18,000,000 acres with grazing surveys to determine the carrying capacity of the forage areas and the practical conditions governing the use of those ranges. This work now is progressing under the funds available at the rate of between two and three million acres annually, the current work being confined to the national forests where the grazing use is most intense. These grazing surveys give us a forage map, showing topography, the character and density of the forage, the numbers of different classes of stock which parts of the area will carry, the location of watering places, the practical routes for driveways, and all other factors which affect the administration of the area as a range unit. The grazing survey thus becomes the basis for range administration by the local supervisor. It gives him a real inventory of his resources to work upon, and we have found that these range surveys have enabled us to work out a better distribution of the stock on many forests, and whatever allows us to make better distribution increases the number of live stock a forest will carry. From that standpoint the grazing surveys have much more than paid for themselves from the increased returns that have resulted from the comprehensive distribution plan of live stock which the grazing survey makes possible.

The work will be continued during the next year on forests in Montana, Arizona, New Mexico, Utah, and Washington, where the conditions require an intensive grazing plan of this character.

EXAMINATION OF WATER-POWER SITES.

In presenting the item this year an additional sum of $12,000 has been included, in order to take care of the situation which exists in the examination of water-power sites. When the Federal water-power law was enacted in 1920 an appropriation was made in that act for the work of the Federal Water Power Commission, but when the act emerged from Congress the use of that appropriation was so limited that the power commission was compelled to depend on the services of the Department of Agriculture, the Department of the Interior, and the Department of War, to make the field examinations of sites for which applications have been made to the power commission under the terms of the Federal water-power law.

In other words, the funds of the commission can not be used for the personal services of engineers engaged upon field examinations. The Budget for 1923 continues this same limitation upon the Federal Power Commission, so that as far as we are able to ascertain from the character of estimates submitted to Congress, the power commission will be dependent upon the Department of Agriculture next year for making all examinations of water-power sites within the national forests for which applications are submitted to the commission. This arrangement is extremely unsatisfactory and, in my judgment, illogical; but recognizing it as a necessity, we have met it this past year as best we could. That has required us to pay $13,150 in cash for the salaries of certain employees of the Federal Power Commission here in Washington. It has also required us to furnish officers of the Forest Service, engineers employed upon road construction and other engineering work, to make the examinations in the field of water-power sites, at the request of the commission, when applications have been submitted for the sites.

During the past year, in addition to furnishing a direct contribution to the salaries of the employees of the commission in Washington, we have furnished engineering services in the field to the extent of approximately $24,500 in making these examinations.

Up to January 30, 1922, the Federal Power Commission had referred 132 applications to the Forest Service for investigation, these applications being practically all within the national forests; in fact, the most active or most numerous applications for power licenses that have been made to the commission are for national forest sites in Alaska in connection with prospective paper plants, and for national forest sites in California for all sorts of industrial and municipal purposes.

Out of these 132 applications, 59 have been examined and reported to the commission to date, leaving 73 cases still to be examined; and additional applications are coming in all the time.

The Forest Service, in other words, is carrying a very heavy load in attempting to do this work for the Federal Power Commission in a manner satisfactory to the commission, and at the same time without serious disruption in our regular work. The effect of the enactment of the Federal water power law has been to greatly stimulate the applications for the development of water-power sites, and the amount of this work now on hand has literally swamped our present resources to handle it.

Wholly aside from the fact that as the Budget now stands the Forest Service will have to continue to contribute some $13 000 to the expenses of the commission in Washington we will also have to get some additional engineers for next year in order to clean up the existing volume of work that the commission has referred to us and take care of additional applications at a satisfactory rate.

Secretary Wallace has been very anxious as a member of the commission that this work be done expeditiously and that the applicants for power sites under the new law be not unduly delayed in securing action because of delays in examining the sites for which they have applied; and we, of course, have desired to expedite the work of the commission to the utmost, but the burden which that entails has become very serious. And for that reason we have included the sum of $12 000 in this item for relief to that extent in meeting the situation which the nature of the Federal water-power law imposed upon us.

It has seemed that since the examination of water-power sites is part of the general work of getting the resources of the national forests into use the increase should more properly come under this item than under any other, and that is the reason for its inclusion here.

Mr. **Anderson**. Do you know, Col. Greeley, to what extent other departments of the Government are contributing to the work of the Federal Water Power Commission?

Col. **Greeley**. Only to this extent that substantial contributions have been made both by the War Department and the Interior Department. Several Army engineers have been assigned to work for the commission by the Secretary of War and the Interior Department has furnished some assistance—how much I can not tell you.

Mr. **Anderson**. The net result of the provision in the act, or at least the situation as it stands, is that nobody will be able to tell how much it is costing to run the Federal Water Power Commission.

Col. **Greeley**. No, sir. It is split between three departments. It would be a much more clean-cut proposition to give the Water Power Commission an appropriation and let them use it and avoid the situation which is unsatisfactory to them and to us.

Mr. **Buchanan**. Is there any provision in the act creating the Water Power Commission for them to call on the different departments for this information?

Col. **Greeley**. Yes, sir.

Mr. **Buchanan**. Is there any provision authorizing the departments to pay part of the salaries?

Col. **Greeley**. It has been so interpreted by the solicitor of the Department of Agriculture.

Mr. **Buchanan**. It looks to me like that is the most unsatisfactory condition of the whole business.

Col. **Greeley**. Yes, sir.

Mr. **Buchanan**. Taking a part of your appropriation to pay the personnel of an independent department of the Government in Washington.

Col. **Greeley**. The theory on which that provision was drafted was this: Prior to the creation of the Federal Water Power Commission the development of water power was handled separately in the Department of Agriculture for water-power sites in national forests, in the Interior Department for sites on unreserved public lands, and the War Department in connection with navigable streams. The people who framed this law said that presumably each of these departments are now organized and officered to carry the water-power work within the field of that department; therefore, in creating the Federal Power Commission to centralize the whole thing and to coordinate the policy as to water-power development, we can still draw upon the services of these three departments to do the work of the commission.

Mr. **Buchanan**. What theory was it on, to draw from the funds of the three departments to pay the salaries of the personnel of this commission? They can utilize the information by reason of the fact that you have had these water-power sites under control; that is all right, but to draw part of your appropriation to pay part of the salaries of the personnel in Washington is not right. We can not tell how much the commission will cost us.

Col. **Greeley**. No.

Mr. **Anderson**. I do not understand that either, because the original act contained $150,000, and there was another one for $100,000, and still another for $150,000, which, as I have it in my mind, were available until expended.

Col. **Greeley**. There is a limitation there, Mr. Chairman, which precluded the use of that fund for personnel services. It can only be used to pay expenses under certain conditions, aside from the personal services of the executive secretary of the commission, which are specifically provided for.

Mr. **Buchanan**. Do these departments contribute?

Col. **Greeley**. Yes, sir.

Mr. **Buchanan**. Do you know whether or not they have included an additional amount in their estimate for that service?

Col. **Greeley**. I can not answer you that.

Mr. **Wason**. I think it is done by detail, is it not?

Col. **Greeley**. The War Department does it by detail.

Mr. **Wason**. Do not your other departments do it by detail?

Col. **Greeley**. You can call it "by detail." They take the people, and those people work for them exclusively. We only pay their salaries; that is all we have to do with it.

Mr. **Wason**. It is the same as the Alien Property Custodian having a certain number of men detailed to the Civil Service Commission, and it runs all through the departments. They detail, but stay on certain pay rolls; and I presume, Colonel, you have a detail from the Civil Service Commission as well as the Alien Property Custodian?

Col. **Greeley**. We furnish them with help from time to time.

Mr. **Wason**. To turn a man or woman over to them for one day is a detail; and 300 days, that is three hundred times that.

Col. **Greeley.** The carrying of the commission's personnel, Mr. Wason, is a permanent proposition. The power commission built up a permanent organization, and they have the business which requires it. They have a staff of experts, auditors, and accountants, etc., and they have to have these field representatives in every part of the country to act on the applications, make the examinations, and submit their recommendations and reports for the commission in Washington for its action. It is permanent, not temporary. It will not disappear in a few months, and as the work is now organized we simply have to set off this amount toward the expenses of that organization, besides taking care of the applications that they refer to us for examination. We are perfectly glad to do it, but it occasions a good deal of work and catches us in a pretty tight pinch.

Mr. **Anderson.** Does your department have anything to say as to what power permits shall be issued in national forests?

Col. **Greeley.** Any permit involving the use of national forest land is referred to the Forest Service, and we have the opportunity to offer objections if we have any to offer, or indicate the stipulations which the permittee should accept as to the elimination of fire hazards from any cutting operation that he may carry on, and the payment he shall make for any timber destroyed, or other phases of the proposition which affect the national forests; and, of course, our Secretary is a member of the Federal Power Commission. We have had no difficulty on that score. Any stipulations we have asked to be incorporated in permits have been so incorporated.

Mr. **Watson.** I suppose the purpose is to cover the national forest reservation wherever available with large dams and holding places of water?

Col. **Greeley.** When such applications are submitted, of course they are considered on their merits, and the injury which the power development would entail to any other resource is considered and an adjustment reached. The application may be rejected altogether if it is felt that the water-power development would destroy more than it would create in the way of economical values.

Mr. **Buchanan.** Have any water-power privileges been granted?

Col. **Greeley.** Yes, sir; the commission is approving applications all the tine.

Mr. **Wason.** In the national forests?

Col. **Greeley.** Yes, sir; in the national forests.

Mr. **Buchanan.** Have any operations been commenced?

Col. **Greeley.** There is some work in progress, Mr. Buchanan, on a number of licenses. Of course, you will appreciate that prior to the creation of the commission the Secretary of Agriculture issued licenses for a considerable number of projects in the national forests, under the former legislation, and construction work is still going forward on a number of them. Construction work has been taken up under some of the new licenses in California and in Alaska, and in one or two other places.

Mr. **Anderson.** It has to be taken up under the law?

Col. **Greeley.** Within a specified period.

Mr. **Anderson.** After the application is granted?

Col. **Greeley.** Yes, sir.

Mr. **Lee.** What is the time, do you recall?

Col. **Greeley.** I think the limit is two years.

Mr. **Lee**. That is my recollection.

Col. **Greeley**. During which actual construction must begin.

Mr. **Wason**. Have any applications been denied by your bureau?

Col. **Greeley**. I do not recall any applications that have been denied. In several cases, however, we have requested the commission to insert certain stipulations, which an applicant might regard as having the effect of denying an application.

Mr. **Anderson**. That is to say, the applicant would not accept the permit under the stipulations imposed?

Col. **Greeley**. No, sir. That might be the result, but as a matter of fact, there have been no cases of that sort,—no cases in which the applicant refused the permit or license on account of the stipulations which we recommended to the commission for inclusion in the permit.

Mr. **Anderson**. Let us drive on.

FOR OTHER MISCELLANEOUS FOREST INVESTIGATION AND FOR COLLATING, ETC., OF EXPERIMENTS AND INVESTIGATIONS.

Col. **Greeley**. The next item is on page 110, for miscellaneous forest investigations, etc., which is expended for two purposes. The first use of this fund, which aggregates $15,998, is for the compilation and printing of maps and the maintainence of statistical records covering all phases of the work of the Forest Service. The other portion of the fund, $15,282, goes into the work of our branch of public relations, in the preparation and editing of material for publication, furnishing information to the press, and the preparation of forestry exhibits, including photographs and lantern slides and other work of an educational and informational character.

I want to ask Mr. H. A. Smith, who is in charge of that branch of the work of the Forest Service, to explain to the committee the general nature of this informational and educational work.

Mr. **Smith**. The branch of Public Relations in the Washington office, in addition to the $15,282 from this appropriation, receives additional amounts from certain other appropriations.

Mr. **Anderson**. How much?

Mr. **Smith**. The total amount of statutory salaries is $21,300. From the general administration fund $2,400 is derived, making, with the miscellaneous forest investigations, a total of $38,982. The part that is derived from the miscellaneous forest investigation item pays the salaries of six persons, totaling $14,812, and includes also $470 for expenses.

Mr. **Buchanan**. What is your total salary list for this division?

Mr. **Smith**. $38,982, less $470, making a total of $38,512.

The office units of organization comprise publications, exhibits and motion pictures, photographs, lantern slides and school exhibits, and information for the press, together with branch supervision.

These units do not indicate the activities in full of the branch. To help make clear what the activities are, I want to speak of their purpose, which is to facilitate the performance of the work of the other branches, each in its own field. The purpose that is of outstanding importance is the facilitating of the protection of national forests against fire, with a view to lessening the expenditures and lessening the destruction of Government property and of timber required for the future needs of the country.

In order to secure effective protection of the national forests, it is necessary to have the full cooperation of the public. The western national forests are of such character that as civilization advances, as industries develop and enter them, as roads are built through them, and the number of people increase, if there is not on the part of the public a keen sense of the necessity of keeping out fires, the task of protection will become not merely increasingly difficult but well-nigh impossible. Those forests, of course, the committee understands, are very different in their character from the forests in the eastern part of the country, and particularly the hardwood forests, because they are very much more exposed to fire, and the consequences of fire are very much more serious.

Before the Forest Service took charge of the western forests they had been subjected to increasing devastation and depletion from the time that the whites first entered the country—before that. They had been, to some extent, held back and depleted by Indian fires, and also, of course, by fires from natural casuses; but as soon as population began to come in, industry to develop, and people to go into the woods in increasing numbers a condition began to be created with which it is almost impossible to cope solely through an administrative system of protection. Therefore it was recognized by the Forest Service very early in its administration of the national forests that it was necessary to secure the hearty approval of the public; recognition of the importance of fire protection and of its practicability, and to secure the participation of the public in it to the extent of increasing care to prevent fires.

Col. Greeley spoke yesterday of the 6,000,000 people that we now have coming to the forests for recreational purposes. It was only a few years ago when we were incredulous of the reports showing 2,000,000 people.

Mr. ANDERSON. How do you get at the 6,000,000 figure?

Mr. SMITH. They are reported from the individual forests, from each supervisor, and are gathered up from the reports of the rangers, as to the number of people estimated to have gone on the forests, area by area, by the season.

Col. GREELEY. They are only estimates, Mr. Chairman. They are not exact.

Mr. ANDERSON. I appreciate that, and I know it is difficult to estimate crowds of people, particularly where people are not particularly experienced in doing it.

Mr. SMITH. The rangers have a pretty fair basis for an estimate of that kind, and it is checked from outside sources of information wherever it can be obtained.

Mr. WASON. What are some of those sources?

Mr. SMITH. Reports of resorts, reports of the number of people traveling roads to various places, of the use of camping places, of visitors at lookouts—you can get a line on how many people are coming in from many sources. They know how many people are traveling the various roads to Lake Tahoe, for example; they know the number of people stopping at the hotels about the lake—though that does not prove very much, because a large part of them are camping. But in general the forest officers are pretty well in touch with the use of each locality by the public.

Mr. **Wason**. Are these people cautioned to underestimate rather than overestimate?

Mr. **Smith**. I have nothing to do with the gathering of the figures. I can not say.

Col. **Greeley**. They are cautioned to get as close to the exact number as they can. Of course, you will appreciate that we do not use this figure of six million as having any special claim to a high degree of accuracy. It is a rough guess. It is the best guess we can make, but it is a rough one.

Mr. **Smith**. In order to get people to actually practice care with fire, you have got to do a great deal more than secure their agreement that forest fires are not desirable. You have to affect people's habits, and it is a difficult thing to get people to change established habits.

The mountain man is pretty likely, even when he comes into a city, when he drops a cigarette butt, to stamp on it, even if it is on a concrete floor. A city man will flip it away from him—if it is out of an office window, on a street, or from an automobile; he will throw it in the woods where it will fall in dry grass and start a fire; and in order to secure effective interest in the matter it is necessary to seek all possible ways of getting at this thing, of driving the matter home and making people realize that here is something they should genuinely be interested in, that the national forests are of public importance, and to a certain extent are of importance to them individually and to their community, and that it is worth while for them to be careful with fire, and what that means in practice.

Our means of doing that are very varied. They include efforts to enlist the help of all the agencies that we can find that will carry, in one way or another, that message; I might say, to preach that gospel to the people who are going to be users of the national forests.

In spite of the length of time that the national forests have been under administration, and the public character of the work, it still remains true that there are a great many people, even in the West, who know very little about it, understand very little of it. You meet them as you go about. It is therefore necessary, particularly under the conditions that we have now, when many people are coming from a distance into the forests, to study where they come from, the causes of fires in individual forests, and to seek the best ways possible of reaching those people.

Of course, the very first step thought of is to post up notices, warning as to the penalties that are imposed under the law for anyone who starts fires.

That, however, is ineffective unless you can follow it up with a very intensive policing. I do not think that the Forest Service, even at the very beginning, posted many notices of that kind. Instead we posted notices along the roads that would secure the sympathetic cooperation of the public. Then gradually we began to devise effective catch phrases and slogans; and also to consider the effective posting of these signs, the very same sort of thing that you have to consider in advertising. How far away from a road will a sign be read? That depends, of course, on how fast you are going past it, the size of the letters, the distance, coloring, and background. These have to be taken into account.

Well, that gets the man after he actually reaches the forests; but is that soon enough to begin? If he does not know much about the national forests he has not much interest in them, and you are not going to get far with him under those circumstances.

The beginning of the publication of recreational folders and maps was an attempt to find a new way of carrying this idea of caution, of preaching the gospel of fire prevention to the people coming to the forest. We were considering how we could reduce the number of fires, and our people said, "If we can give a man something he wants to take with him because it has information on it that he needs when he is out in the woods and he has no other reading matter, he will read it through; we will get him to read in that way and carry with him what if put in an ordinary circular he would throw away without reading at all."

Then there was, of course, the possibility of using the newspapers to make people better acquainted with the objects of the whole business, what we were trying to do, and impress upon them the particular lesson of care with fires. We can do that in individual cases, by the story of the fire, the news that a fire has broken out, what its cause was, bringing out if it was carelessness; we can do it by giving publicity to prosecutions of people who start fires. Individuals who have been fined for carelessness with fires and things of that kind.

As an illustration of how various agencies are utilized, I would like to say something for a moment on the conditions that exist in the State of California, as affording a concrete illustration.

We have in the State of California a population of three and a half million people. One million are in Los Angeles County; there must be considerably more than a million around the bay, and a large percentage of the rest are in the interior valley region.

The people of California, particularly with the development of automobile travel, and with the extension of their system of highways, have the outdoor vacation habit to a very high degree. Thousands of them, thousands upon thousands of automobile parties, start perhaps from southern California and go north, touring through four or five forests, and from those hot interior valleys in the summer time eastward into the Sierras, and then generally the drift is north. They may go from central California into Oregon, and sometimes even into Washington.

One way of reaching those parties is through the children, because when a family goes off in that way the children go along.

Last year we had in San Francisco an exhibit prepared, and arrangements were made with the school authorities to have the children of the sixth, seventh, and eighth grades come with their teachers, as a part of their school exercises. Periods covering practically all the school day were arranged for, with classes coming one after another in groups of 70 or more at a time. For 30 or 40 minutes they went around the exhibit, listening to the explanation given by forest officers and asking questions. The background showed a California forest scene. Then there were the tools that are used in fire fighting. There was a camp fire properly built. There were little scenes in the form of models, lighted, at which you could look through a glass front, each showing some feature of the national forest administration. The result was that the children, after they had gone through this display and after the talk that was given to them by the forest officer, that was worked up with the school authorities, so it would fit in with their educational purpose as well as serve our particular purposes—those children went away with something of a very definite character. Those children, in many cases, brought their parents back later on to show them this exhibit and tell them what they had heard. And we can feel pretty confident that a great many of those children, when they go out with the family into the woods, are going to be prepared to give their elders admonition and will take great pleasure in showing them, if the practice of the older people does not conform to what the children have learned.

After that was done in San Francisco the school authorities in Oakland heard about it and requested that the show be sent across the bay and set up there, and that was done. And for three weeks there were some 3,500 children a week coming to see the display and getting their lesson from it. We would have liked to put that same thing on trucks and sent it up and down the valley to the larger towns, from which these camping people are drawn, but we did not have the funds to make it possible.

We have also the individual forest ranger going into the country schools and talking to the children there in his own neighborhood as to what the work is that he is doing, and giving them a better appreciation of the needs of fire protection in that locality.

Mr. BUCHANAN. If there are 6,000,000 people visiting these forests, evidently there must not be over 1,000,000 from California in that neighborhood, or 2,000,000; half of them come from the balance of the United States?

Mr. SMITH. Yes.

Mr. BUCHANAN. Carrying out your theory that you want to put these moving-picture shows on trucks and exhibit all over the country, and educating the children, what have you to say on that?

Mr. SMITH. We have the motion pictures of the department here that are available as opportunity offers. We recognize that this is not a thing that can be done in a moment. I said it was necessary to seize on all possible means of doing it.

Here is a copy of "Safeguarding America From Fire." Last spring President Harding issued a proclamation proclaiming a week in the latter part of May as forest-protection week. Before that the National Board of Fire Underwriters got out an issue of their publication dealing with our forest resources and forest fires; 160,000 copies were printed, and 60,000 copies were turned over to the Forest Service and State forestry departments for distribution. And also, in connection with that forest-protection week, programs for public observance were worked up, ministers were invited to call attention to the public importance of the matter, the newspapers in the West published editorials and news articles.

In the Oregon-Washington district alone the total amount of material that went into the newspapers on forest protection week was equivalent to 23 newspaper pages of solid reading matter, some 3,500 inches all told; and that was only a small part of it.

Communities put on parades; there were all kinds of observances, and schools took it up largely. And this is another illustration, like the example cited of the school exhibits in California, a single illustration of the very many means of enlisting organizations wherever we can get them to help us in this very large and country-wide task, a thing that can not be accomplished in a moment or a year.

It has got to be gone at persistently, but nevertheless in the long run—and in the short run, too—will very definitely reduce the number of fires per thousand visitors that the Forest Service has to contend with.

We have gotten the makers of cartridges to print slips, to insert in the cartridge boxes a slip like this [showing slip], which is packed in the box. Four of the largest ammunition manufacturers in the country are now packing these slips in their cartridge boxes.

Then there is the need of getting after a particular class of people in a particular locality, as, for instance, settlers. Here is a little pamphlet, gotten up as effectively as possible, designed to enlist their interest in preventing the escape of brush fires.

We printed windshield stickers and tried to secure the interest of the automobilists with a sticker that can be put on the front of the automobile and that indicates the interest of the occupant in the subject. This next year we hope to combine that with the camp-fire permit system which will be put in force for the entire State of California, and use it as the evidence to the forest ranger that the occupant of the automobile has taken out his camp-fire permit.

The forest officers, the forest force throughout the organization, are being brought into this work and their help secured locally [n the furnishing of material to papers, and in talks to schools, and also a great many individual efforts are made. I will give you one little illustration. One forest officer went to all the stores in town and got the storekeepers to wrap their packages with red string and put notices in their show windows that the red string is to remind people to be careful in regard to forest fires. When you get an entire organization interested in this sort of thing you can get a good many different kinds of results.

Mr. **Anderson**. There is one thing I want to ask you about. There is one subitem, maps, and surveys; you have a salary roll of $2,200; equipment, material, $9,430. That is a good deal of equipment and material in connection with such a small salary roll?

Col. **Greeley**. That is in regard to compilation and printing of maps; a portion of this fund goes into that purpose. There is no actual survey work; but it is entirely the material used in making maps and the actual preparation of maps, the printing of them, which is done by contract with the Geological Survey.

Mr. **Anderson**. All right. Take up the next item.

FOR CONSTRUCTION AND MAINTENANCE OF ROADS, TRAILS, BRIDGES, ETC.

Col. **Greeley**. The next item, construction of roads, trails, and bridges in the national forests.

Mr. Headley, will you discuss that?

Mr. **Headley**. There is an increase of $50,000 in this item, about which I should like to speak first.

The protection and administration of the national forests have always been handicapped, and the Government has lost money because of the lack of working equipment in the shape of trails, telephone lines, lookout houses, quarters for fire guards, dwellings for rangers, development of springs for stock, stock driveways, fences, and so on.

The Government has lost money because the lack of these improvements has made it necessary to spend more money fighting fires and because the national forest ranges graze less stock than they would if the springs were developed, fences built to keep out drifting stock, and bridges and driveways built to get the stock into the back ranges.

Trails have been provided for by a recent appropriation of five and a half million dollars for a two-year period, for trails and minor roads needed for protection and administration of the national forests. This we expect to go a long way toward opening up the forests so that guards can get to fires while they are small, while they are still in the one-man size.

But we still lack such indispensable things as lookout houses, telephone lines, cabins for fire guards, barns and pastures for their horses, and the range improvements that would bring the grazing revenues up to what they ought to be.

As I indicated yesterday, we have found that speed is the essence of success in fire control. We are learning to talk fire control in terms of elapsed time, time that elapses from the start of the fire until the first man begins to work on it and constructs a line around it. We must fight continuously to cut down the minutes that elapse between the start of a fire and the moment when a fire guard gets to the fire and starts work on it.

To begin with we must have our lookouts on the extreme tops of the mountains which are used for lookout purposes, and they must be housed in shelters which have windows on all sides, in order that during every waking minute, whether standing up or sitting, the lookout watchman has his country under his eye and will see the smoke from a forest fire the minute it is visible. Without these lookout houses a lookout watchmen is only partly effective. No human being can stay on these peaks for any length of time without shelter when the wind is blowing—and it blows most of the time on the higher peaks.

Mr. ANDERSON. If you got along without the appropriation, when you didn't have the appropriation, why can you not do it now?

Mr. HEADLEY. It would enable us to catch the fires quicker. The only way we could do it was to do without the equipment and suffer the resulting losses in timber and fire-fighting expense.

The wind blows so on the higher points—and some of our lookout points occupy places 13,000 feet in elevation—that a man has either got to have a dugout up there and take refuge in the dugout; or take a station near the mountain top. When the lookout watchman is down in a dugout to keep out of the wind, or down at a cabin at the nearest water, there is no lookout service being given. And if a fire starts while a lookout watchman's eyes are not on the job our whole fire protection system breaks down right at the beginning. And that, Mr. Chairman, is what has happened in an uncertain number of cases; and it is in just those cases that we have the conflagrations that gets to large size, and we have to ask for a deficiency appropriation, and that is the way we have to get along without this particular form of improvement. We have some houses, but we have not enough. Our organization of guards and rangers and cooperators can not get into action on incipient conflagrations if the lookout does not report them, because of his being away from the top of the peak, cooking a meal, or keeping out of the wind.

These lookout observatories are 12 by 12 feet in size and filled with compact facilities for cooking, eating, sleeping, and locating fires, so that the lookout watchman never needs to leave his post except to pack up water, and that is often packed to him by other men.

We have 150 of these lookout houses, but we need a minimum of 300 more. They cost from $500 to $800 each. Although the amount of material used is not large, they have to be anchored down carefully to keep the wind from blowing them away. Often the top of a sharp peak has to be blasted away to get a place to set the house, or on a rounded peak the building has to be set up on stilts from 10 to 40 feet high, so that the watchman can see down over the edge of the mountain at a sharp enough angle to command a view of the country lying close to the lookout mountain. The cost of the building is increased by having to pack lumber and windows over precipitate trails on the backs of animals.

After a lookout sights a fire the alarm must be given to the guard nearest the fire. At present many guards are not located where they should be, because we have not been able to run a phone line to the proper location. In order to keep the guard in communication, we have to locate him at the nearest phone line, which is often miles from where he should be.

We have now 24,000 miles of telephone line. Our present estimate is that we need 7,000 miles more. Much of the telephone line we have will have to be replaced sooner or later, because, for one thing, we did not know as much about building telephone lines in mountain regions in the early days of the national forests as we know now, and much of our mileage in telephone lines has had to be built too cheaply because of the necessity of getting some sort of communication quickly.

These lines cost from $70 to $100 per mile; wire alone under the present contract costs from $25 to $30 a mile laid down at the nearest railroad point.

We have learned how to build a phone line that is, we think, adapted to the mountain and forest conditions in which we have to operate. We swing the No. 9 telephone wire between trees, fastening it to the trees by wire hangers that are nicely calculated to break loose from the tree just before the line wire itself breaks when a tree falls on the line. Falling trees are the chief difficulty with a telephone line running through the timber, and in a great proportion of the national forests windfalls are common in wintertime and also occur during the summer. Some parts of the national forests are subject to mild hurricanes, which blow down timber and put the telephone line out of business unless it is built according to the best methods and specifications that we have been able to formulate.

When a tree falls on one of our lines, the wire goes to the ground; but communication is uninterrupted, and at the first opportunity a guard or ranger cuts off the windfall and hangs the line back on the tree. This system has been adopted by the telephone companies that have to operate telephone lines through the mountain regions in the West, and we have this evidence that leads us to believe that it is the best and cheapest method that can be developed for mountain conditions.

Then we need 533 cabins for fire guards. We have 596 now. We need at least 533 more.

We employ, as Col. Greeley told you yesterday, something over twenty-three hundred fire guards each season, and in a large number of cases, at the present time, we are forced to use tents to shelter these men in the summer time. A tent is about as expensive a way of housing a man as you can find. A tent wears out or blows out, or goes to pieces for one reason or another, in from two to four years, and canvas is expensive, has always been expensive; and in a tent there is no proper place to store anything, and the tent itself has to be taken down in the fall of the year. The stuff that you might leave on the job for next spring—tools, equipment, and supplies—you have to pack out, because you want to save them, and packing out and packing back again is quite an item of expense and a consumer of time.

We need 176 barns for fire guards. A barn for a fire guard might seem a luxury, but the fact is that in many places where guards have to be stationed we have no meadow grass at all, or else an insufficient amount. Where we are able to use horses, we want that horse at hand and saddled, at least during the daytime, so that minutes may be saved to the utmost when an alarm comes in. Keeping an animal ready to use in that way means keeping him up on dry feed, and dry feed if kept in a tent is kept in a wasteful condition.

Mr. ANDERSON. What are these cabins or barns constructed of?

Mr. HEADLEY. Lumber. We find under ordinary circumstances, if lumber is within a reasonable distance, it is cheaper to use lumber than logs. When we get beyond 5 miles from a wagon road, it is a different matter, and we use logs; but a log house can run into money very fast, if it is not constructed by experts; and the experienced log-house man is rarely found nowadays.

We have scarcely been able to make any headway with the improvements needed to make a reasonably full use of the grazing ranges. Stock should not travel more than about 3 miles to water. If water does not occur at the right intervals, range feed goes to waste. They can travel farther; wild horses go much farther, but it is not profitable with domestic stock, cattle which are to be sold for beef, or sheep handled for mutton or wool. They should not have to go to water more than about 3 miles. Usually springs, seeps, reservoirs, or even occasionally wells can be developed, making the range graze more stock and making the stock which are grazed put on more flesh during the summer season. Our best estimates, based on our experience with such range improvement, show that an investment of $50,000 in water development, bridges, driveways, and fences, and so on makes it possible to graze 8,000 head of cattle and 40,000 head of sheep, which we could not graze without that investment in that kind of improvements. This means that with the present schedule of grazing fees, the Government should get its money back in seven years from an investment in range improvement, and would have the improvements left at the end of seven years, together with the permanent increase in the carrying capacity of the national forest ranges.

Mr. **Buchanan**. $50,000 would provide for 40,000 head of sheep?

Mr. **Headley**. And 8,000 head of cattle.

Mr. **Buchanan**. Does it take the Government seven years to get $50,000 out of 48,000 head?

Mr. **Headley**. Yes; that is figured this way: Our average feed per head for sheep for the summer season, which occurs in the different national forests, according to the climatic conditions, is 12 cents; our average figure for cattle is 72 cents; which gives a sum which actually retires that investment in five years. But I am allowing two years for conditions beyond our control.

Col. **Greeley**. It is for the improvements in a specific grazing district.

Mr. **Buchanan**. In some cases when you want water you would have to build windmills?

Mr. **Headley**. We would have to build windmills, as in the lava region of Oregon, where there is no water to be had over large areas, except by the digging of wells; and it has been for a long time a problematical matter whether water could be secured. But now a well can be driven, due to the experimental wells of the Forest Service and private owners, through the lava rock, and good supplies of water can be supplied within pumping distance. Every time such a well is sunk it makes practicable the grazing of one to three townships of land that hitherto in that region have grown up year after year to wasted grass. Luxurious grass that has been going to waste and creating a fire menace has given us a great deal of concern. For the past year one of the few grazing improvement projects approved happened to be of that character, which appeared to be a good project from a grazing development standpoint and from a fire protection standpoint.

Mr. **Anderson**. Why did you not call for windmills? I suppose you mean by this appropriation to provide those places?

Mr. **Headley**. Water developments other than wells constitute a great majority of the water improvements we make. On the rough land there is very frequently a seep of water which, when undeveloped, does not make enough water for stock. When they are fenced and fixed up they very frequently supply the stock than can use the range surrounding them.

In the Southwest, and to a less extent elsewhere, the construction of boundary fences is a pivotal requirement for effective administration of the grazing ranges. In a country where stock runs the year round on the open range, the herds drift back and forth up to the higher grounds in the national forests in summer and down to the lower ranges outside of the national forests in the winter.

Owners in many places do not know accurately how many cattle they own, and it is not possible to tell with any accuracy how many cattle graze on the forests, or for how long they graze. There are round-ups, and they have branded the calves; but by branding the calves they can not count the older stock and tell the loss that has occurred between the branding of the stock and the round-up. To control this stock on an unfenced range is an impossible thing—I mean complete control—and it sometimes happens that serious damage is done to tree reproduction, because a number of stock drift in beyond the proper carrying capacity of the range, and the animals damage the young trees.

We do the best we can to control the drift stock. We have endless trespass cases and trespass settlements and endless differences of opinion with stockmen, but this is a most unbusinesslike way to go about the matter. It pays in every way to fence the boundaries in such regions. It would pay from the standpoint of net increase of revenue from grazing use; it would pay from the standpoint of simplifying and lowering the cost of grazing administration; it would pay from the standpoint of avoiding damage to range grasses and tree reproduction from overgrazing.

When stock drift back and forth that way, while we do the best we can, it is inevitable that the Government does not get the grazing revenues that it does when the boundary is fenced, as we are able to do in a small degree through cooperation with stockmen, and by use of funds we have had from time to time. We have learned that the grazing fees may be expected to increase when we are able to get the thing under proper control.

Mr. **Lee.** What kind of a fence do you build?

Mr. **Headley.** They vary considerably; but barbed wire, three or four strands, is the standard fence; and sometimes the posts have to be planted pretty close together when the stock is hungry and rough with fences. But that kind of a fence will do the thing pretty well.

Mr. **Buchanan.** How far apart are the posts?

Mr. **Headley.** A rod apart.

Mr. **Lee.** What is the life of wire fence in that country? How long will it take it to rust out?

Mr. **Headley.** There is not much rust there, Mr. Lee.

They last a pretty long time. I do not believe that barbed wire, if kept up right, can be said to rust out.

Mr. **Lee.** They will rust out in 12 years, where I live.

Mr. **Headley.** Twelve years?

Mr. **Lee.** Yes, sir.

Col. **Greeley.** The life in most parts of the West is determined by the durability of the posts rather than the wire.

Mr. **Headley.** Other things that we need are two hundred and twenty-eight 5-room dwellings for rangers, 244 barns at year-long headquarters, 242, small buildings for the rangers to use, in handling their business with permittees, keeping records and doing their mapping work; 320 buildings for storage of tools, supplies, and for doing the many rough wood and iron working jobs which must be done by the ranger in connection with the activities carried on in his district.

With our present appropriation for this improvement work we are able to make very little headway with this job of getting together the simple working equipment of this kind, which is needed at present. We are furnished by Congress with adequate appropriations for trails, but we have not the funds to make anything like comparable headway with the lookout houses, telephone lines, range improvements, and other improvements that are just as essential to the protection and administration of the forests as are trails.

Mr. **Magee.** Congress has not passed a public building bill since 1913.

Mr. **Headley.** I did not know that.

Mr. **Magee**. They can not get one, except for purposes of hospitalization, no matter how great the postal facilities of a town, village, or city may be, they can not get a thing. In view of those circumstances and the great need of the country generally, how could we justify entering upon an extensive scale of building alll over the United States, with this proposition?

Mr. **Headley**. Where public buildings are used there are other facilities to be had. Where these improvements are needed on the forests there is nothing else available to use.

Mr. **Magee**. It is estimated for public employees, for instance, the Government clerks here in Washington, they that ought to have 65 square feet pėr person. There are innumerable buildings in this country where they do not have 40 feet.

Mr. **Anderson**. Have you figured up the total cost of this program, bunk houses, etc.? I want to know what your program is.

Mr. **Headley**. I do not have it with me, in money.

Mr. **Wason**. Do you recall approximately in money?

Mr. **Headley**. No.

Mr. **Wason**. How much was it, as far as you have it?

Mr. **Headley**. The range improvements needed are estimated to come to a total of three and one-half million dollars. There has been invested by private interests with a little cooperation by Government in the forests of the Southwest $3,500,000 in range improvements. From the standpoint of public policy, range control; it is very desirable to have these improvements constructed by the Government in cooperation with the stockmen rather than by the stockmen alone.

Mr. **Wason**. Have you tried, on the fencing proposition, to see if any of the owners of these grazing cattle or sheep will do the fencing and take an option or lease for a certain number of years?

Mr. **Headley**. We have many thousands of miles of stock fences erected in cooperation with stockmen. One particular forest is practically all fenced by stockmen, also the interior fences for the control of stock; and that has been done by the stockmen, with a modest amount of cooperation from the Forest Service; but there are many places where, for different reasons, we have not been as successful. As a rule, however, fences for boundaries can be erected with the cooperation of stockmen. The ordinary practice has been to provide the wire and the stockmen get the posts and do the work.

Of our $400,000 appropriation for improvements, $225,000 are required for maintenance of existing improvements. This is too large, but in attampting to do business and protect the forests with the money available for working equipment of this kind it had to be spread out so thin that faulty methods of construction often had to be followed, with the result that maintenance costs are higher than they ought to be.

During the present year a special effort has been made to neglect everything else that could wait and concentrate on telephone-line construction, but we estimate that it will take two more years to provide the minimum equipment of telephone lines that we need in our bad fire regions, with construction of all the other improvements standing practically still.

It will take from 10 to 15 years to provide even the minimum equipment needed strictly for fire protection purposes with other improvement construction standing still. During this time, if we concentrate on protective improvements, the Government would be losing the increased revenue which might be secured from range improvement, and the country would be losing the business arising from the conversion of this grass into beef, mutton, and wool.

The increase of $50,000 requested is, we believe , an important one and is recommended from a strictly dollars and cents point of view, even in a year when economy is as important as it is now.

A provision has been inserted in this item granting authority to use not to exceed $5,000 in the purchase of land needed for ranger stations. The need for that arises chiefly from this condition: The typical ranger district has its headquarters in a small town, in a valley adjacent to the mountain range. In these little towns the buildings are owned entirely by permanent residents who work their farms from this village. These towns generally are very small.

We have cases of men being forced to live in barns, made over into houses, and in hovels never intended for human habitation, simply because there is nothing else to do. They can not be put on the forest, because if we erected a station for them they would be in the wrong place to handle the work for which they are responsible during the fall, late summer, and spring; their business is with stockmen and other users of the forest. They must have a headquarters where they can be accessible, and these villages are the proper places for such location.

We want to be able to make purchases where these conditions exist.

Another situation which makes this important is the desirability for the Government to have a permanent headquarters in such points. There is a considerable amount of storage of tools, equipment, paraphernalia, etc., used on a ranger district; telephone switchboards have to be installed, and to move such a headquarters from place to place, as is often necessary when a ranger is able to rent a place, and has it sold from under him is very unfortuante.

Mr. **Anderson**. That is unfortunate for anybody; no more so for him than anybody else. Everybody has to move.

Mr. **Headley**. The point is not that the ranger has to move, but the Forest Service has to move its telephone installation. It has to rustle some way of storing equipment and supplies that the ranger has to use, and it all takes time and money.

Mr. **Anderson**. How many of these are you contemplating to purchase?

Mr. **Headley**. We have a list out of which we have selected 12 stations, out of the larger number which it would be good business to provide for in this way.

Mr. **Anderson**. You would not get very many or that money, would you?

Mr. **Headley**. We often have the land donated to us. In one particularly case the land was donated to us by a public-spirited citizen, where the headquarters ought to be; but when he found he would have to go to a considerable expense to have a survey made so that the Government could accept it, this public-spirited citizen could not stand the strain, and that ranger is quartered in a shack 7 miles from where he ought to be, and every time he goes out he has to cover that 7 miles out and back needlessly, and when people want to see him they go without or travel the 14 miles.

Mr. **Buchanan**. You say a ranger ought to be one place, and is located at another. What is the reason that the property belongs to somebody else?

Mr. **Headley**. It is where the location does not fall on public land. It does not happen to fall on a national forest.

Mr. **Buchanan**. This is a headquarters where a telephone is?

Mr. **Headley**. Yes, sir.

Mr. **Buchanan**. These are not lookout stations?

Mr. **Headley**. No.

Mr. **Buchanan**. Is there any reason why he should be there?

Mr. **Headley**. There is a reason why he should be in a particular place; yes, sir. The headquarters of the district is located with reference to the users of the national forests, and the keeping down of the travel required by the ranger going here and there over his district.

Mr. **Buchanan**. To keep down the ranger's travel?

Mr. **Headley**. Yes, sir; making him accessible to the users of the forest and keeping down his travel.

Mr. **Buchanan**. In other words, you want to locate, so far as possible, these headquarters and telephone centers in some little village or town?

Mr. **Headley**. No; not in a town always. The best location is very often not in a town. It is desirable sometimes to keep the stations away from towns, because if a ranger is in town too much of his time is taken up with talking with users of the forests. He can not get away to his field work enough.

Col. **Greeley**. It is a case of selecting the best point from which to administer a district of from two hundred to five hundred thousand acres. It is the best place in reference to the geographical location.

Mr. **Buchanan**. It would seem that you could find on the two hundred and fifty or five hundred thousand acres a suitable location on Government property.

Col. **Greeley**. We can in a majority of cases. From the standpoint of expenditure, this proposition amounts to nothing at all, because the building sites can be obtained for $200 or $300. All we ask is the authority.

Mr. **Anderson**. The place to go for that is the Agricultural Committee. We have no authority for that. We can not give you any authority to purchase land.

Mr. **Headley**. There is also included a request to erect 20 buildings, at a cost not to exceed $3,000. I do not believe there is any argument necessary on this, because there is not a place in the country any more where a five-room dwelling that is suitable for a man with a small family can be erected for $1,000.

We have instances where men are living in dilapidated two-room log cabins that have decayed, as the bottom logs in log cabins have a habit of doing, and with the floor bulging up in the middle; and that place is located sometimes on transcontinental roads, where people stop very often for advice and information as to the roads ahead. And these habitations are, as a rule, less habitable than the homes of the people of the neighborhood, and sometimes when they get in the shape of the one I just mentioned we are under the necessity of doing something to provide the men with some place to live, but we can not possibly build him a home with $1,000, which is the present limit. We do not expect to build in any one year 20 ranger station dwellings.

We could not divert that much money from the urgent protective needs. We do need to be able to complete some of our stations which we have never been able to finish because of the limitations; and there are administration buildings needed occasionally at summer headquarters or some place where buildings of that kind are needed; also storage warehouses are needed where supplies are transferred from trucks or wagons to pack trains for transportation into the interior.

Mr. **Buchanan.** If it is agreeable to the chairman, I wish when you get through your hearing that you would put in the record a compilation of the entire program, how much the entire program will cost the Government.

Mr. **Headley.** Yes, sir.

Mr. **Buchanan.** I guess the chairman has no objection.

Mr. **Anderson.** I will be very glad to have it go in. I would suggest that you put in detail ranger stations, huts, and all the rest of it.

Mr. **Headley.** The statement requested is as follows:

National forest improvements constructed and needed, exclusive of trails and roads.

Improvement.	Number constructed to June 30, 1921.	Additional number needed.	Estimated cost.
Telephone lines ... miles	24,401	7,294	$583,520
Lookout houses	150	301	180,600
Lookout towers	142	110	22,000
Cabins for fire guards	596	533	159,900
Barns at fire guard cabins	199	176	35,200
District ranger stations	514	228	463,606
Barns at district ranger stations	568	244	122,000
Ranger district office buildings, workshops, tool houses, storerooms	376	563	168,900
Administrative fences ... miles	2,103	678	203,400
Total protective and administrative improvements			1,939,126
Range improvements—bridges, water developments, fences (boundary and division)			3,500,000
Grand total			5,439,126

Mr. **Buchanan.** You said it was impossible to construct some of these ranger houses. What per cent are they completed?

Mr. **Headley.** We have dwellings with four rooms or more, the headquarters stations, now to the number of 514.

Mr. **Buchanan.** That is not the question. How many houses have you partly constructed and had to stop because the appropriation was not sufficient?

Mr. **Headley.** I can not give you the exact number. I should say there are 30 buildings.

Mr. **Buchanan.** That are incomplete?

Mr. **Headley.** That are in various stages of incompletion. Sometimes the upstairs merely needs to be finished, and sometimes the weatherboarding is not on, and sometimes there is no finishing inside, merely the rough lumber or studding.

Mr. **Buchanan.** Are they in use?

Mr. **Headley.** Yes, sir.

Mr. **Buchanan.** You have no separate estimate, as to what it would cost to complete these incompleted buildings?

Mr. **Headley**. No, sir; I have not.

Col. **Greeley**. We do not undertake to construct a building unless we can carry it forward to a point where it can be used.

Mr. **Buchanan**. My idea is this: This committee might look more kindly toward the completing of an incomplete building, so it will not be damaged, and it will also be serviceable.

Col. **Greeley**. I do not think that is our situation. We have done the best we could under the general limitation of $1,000 on the cost of any structure, and we have adapted our ranger stations to that limitation, making them small, and, to a certain extent, inadequate, but reasonably complete. The point, of course, is that a building adequate to take care of a man with a family at a central, year-long ranger station can not be built within $1,000.

Mr. **Buchanan**. Certainly not.

Mr. **Headley**. For that reason we have asked for authority to construct a limited number, not to exceed 20, at a cost within $3,000.

Mr. **Watson**. Are those houses built of wood?

Mr. **Headley**. Yes, sir.

Mr. **Wason**. And laths and plastered inside?

Mr. **Headley**. Very seldom.

Mr. **Wason**. Do they have inside boarding?

Mr. **Headley**. Yes, sir.

Mr. **Buchanan**. Do they have ceiling?

Mr. **Headley**. Yes, sir; they have a ceiling. They are sometimes box houses having just one thickness of board.

Mr. **Wason**. Do you think that method of construction would cost $3,000?

Mr. **Headley**. No, sir. But we do not consider that form of construction is economical in the long run. Such a building has structural weaknesses that would make it give way and make its maintenance costly.

Mr. **Wason**. Is it boarded outside and inside?

Mr. **Headley**. That is the best we have been able to do. A great deal of our country, of course, is not so cold that laths and plaster is essential.

Mr. **Wason**. Do you use boarding for the inside?

Mr. **Headley**. Yes, sir; when they are finished.

Mr. **Wason**. What would be the dimensions of these houses, 30 by 30, or 20 by 20?

Mr. **Headley**. Twenty-four by twenty-four.

Mr. **Wason**. Twenty-four by twenty-four, two stories high?

Mr. **Headley**. Usually one story.

Mr. **Wason**. And they cost you $3,000?

Mr. **Headley**. No, sir; we never have built any.

Mr. **Wason**. You need this limit of $3,000, when you have been operating heretofore with $1,000, and that is a 300 per cent increase.

Mr. **Headley**. We would like to give them a five-room building. That is ordinarily adequate for a man with a small family, which building would be a story and a half. It would be finished inside with boards, cloth, and paper usually, good roofs, and a good wall, a good sturdy foundation. We have more trouble with foundations than anything else. That is one of the things we have to remedy. Another difficulty is that the comptroller has held that sewerage and water supply systems are a part of the cost of a building and the water sometimes has to be brought for some distance to a ranger station. You can not always pick a building site that has water close by, and even a quarter of a mile of pipe line, bringing water that far, cuts a hole in the building limits.

Col. GREELEY. I would like to make it clear to the committee, Mr. Chairman, that since the enactment of the forest road appropriation, beginning in 1916, this item has been largely relieved of the construction of trails, because it has been possible to build the trails under the provisions of the appropriation for forest roads. Since that time, we have devoted this item very largely to the construction of other protective improvements, particularly telephone lines, lookout houses, with a limited amount to the completion of the headquarters stations for the yearlong ranger force. The telephone construction has been carried forward to a point where it is something like two-thirds completed; in fact, you might say in general, that the construction work necessary for the administration and protection of the national forests is about two-thirds completed in all respects, so that while the sums for further completion will run up $2,000,000 or $3,000,000, the project is not quite as forbidding as it might appear from some of the things said here this afternoon.

What we desire is to complete the fundamental improvements as rapidly as we can. The question of range improvements is somewhat of another story, but it is equally desirable for the Government to extend, but less urgent, in my judgment, these improvements which deal fundamentally with the protection of the property.

Mr. BUCHANAN. How much did the good roads act relieve this fund of by reason of eliminating trails and bridges?

Col. GREELEY. Before the appropriations were made for forest roads, this fund was possibly split into about four parts; one part going for trails, one part for telephone lines, and the other for protective improvements, and another part for range stations and administrative improvements.

Five or seven years ago we were using perhaps one-fourth of this appropriation for trails with a little spent on roads. Since then we have been gradually reducing the amount spent on trails and have spent virtually none on roads because we felt that it was necessary to use all the available funds for protective improvements. During the last two fiscal years only a nominal amount of this appropriation was spent for trails, so that the road appropriation restores to us the opportunity to extend our trail system but does not really relieve this appropriation to any appreciable extent.

We have simply been working away on the most essential projects out of a large program, building the most needed telephone lines and other improvements and we still have a great deal of necessary work to complete.

Mr. ANDERSON. Do you want to discuss any further the item referring to the postponement of the payment of grazing fees, which apparently according to the estimates you suggest should be eliminated?

Col. GREELEY. I think nothing further on that point is necessary, Mr. Chairman. We recommend the elimination of that language. We think the situation does not justify another postponement.

Mr. ANDERSON. When will this be?

Col. **Greeley.** Under the law, the grazing fees were due on the 1st of December, and we are in the process of collecting from all delinquents.

ADDITIONAL CLERK IN INSPECTION FORCE FOR FOREST PROTECTION IN COOPERATION WITH STATES.

Mr. **Anderson.** You have some other items over in the miscellaneous section, I think?

Col. **Greeley.** Is there any discussion necessary on the item on page 115? It does not appropriate any money but simply increases by $2,000 the amount which can be spent in the District of Columbia out of the current appropriation to conduct the work authorized by certain sections of the Weeks Act.

Mr. **Anderson.** What is the reason for that increase.

Col. **Greeley.** The necessity for increasing the inspection force under the Weeks Law which provides for forest protection in cooperation with States. That appropriation was increased last year from $125,000 to $400,000 and we find it necessary in carrying on the larger scale of work to increase the expenditures in the District of Columbia to this extent.

Mr. **Wason.** Does that mean an increase in salaries or the appointment of an additional clerk?

NATIONAL FOREST RESERVATION COMMISSION.

Col. **Greeley.** The appointment of an additional clerk or inspector.

There is one other note. At the bottom of page 115 is a continuing appropriation for expenses of National Forest Reservation Commission of $25,000. The chairman of the commission, the Secretary of War, has recommended to the chairman of the House Committee on Appropriations that that amount be reduced to $5,000.

COOPERATIVE FIRE PROTECTION OF FORESTED WATERSHEDS OF NAVIGABLE STREAMS.

On page 248 there is an item for cooperation with any State or group of States in the protection from fire of the forests on the watersheds of navigable streams, continuing the appropriation of $400,000 which was made for the same purpose during the current fiscal year. Of this amount $375,125 is expended by 26 cooperating States through the forest commissions or other forest authorities of those States. This fund is used exclusively for personal service of rangers, lookout watchmen, and patrolmen in carrying out systematic fire protection; $21,590 of the $400,000 is being expended this year by the Forest Service for supervision and particularly for the inspection of the efficiency of the protective work done by the States with the amounts allotted to them; $375,125 is the amount allotted to the 26 different States, the supervision and inspection covers $21,590.

The remainder of the fund of $3,285 has been held in reserve for the allotment to new States whose cooperation it is expected to secure with the beginning of the new fire season.

By the terms of section 2 of the Weeks Law, under which this work is conducted, the expenditure in any State may not exceed the expenditure of that State for the same purpose during the same fiscal year. In most cases the Federal expenditures are much less than the corresponding expenditures of the State. For example, in Maine the Federal Government is expending this year $24,550, while the State expends $160,000. In Pennsylvania our allotment is $27,500, while the State expends some $500,000 for fire protection. In Michigan and in Minnesota the Federal Government is expending from $25,000 to $28,000 in each State; whereas the State expenditures range from $140,000 in Michigan to $178,000 in Minnesota.

The 26 cooperating States with whom this work is carried on expend all told, or will expend during the present fiscal year, approximately four times as much as the Federal Government. I want to make it clear that this money is not used for the protection of the national forests. It has no relation to the protection of national forests. It is used for the protection of forest lands or to assist in the protection of forest lands in State or private ownership and on the headwaters of navigable streams.

When the Weeks law was passed in 1911 the private forest lands of the country were receiving protection only in very limited regions. The first year's budget which the Forest Service made up under the Weeks Act on the basis of equal expenditures by the cooperating States amounted to only $40,000. The stimulus which has been given by Federal Government leadership and Federal cooperation under this section of the Weeks law has had much to do with the rapid expansion of general forest protection in the United States during the past 11 years.

Over six times the amount of money is now expended for forest protection by the States and counties and municipalities than in 1911, when the Government adopted this policy of financial cooperation. Furthermore, private owners are doing very much more in the way of forest protection now than they have ever done before, and the expenditures of private owners for the protection of their holdings, either individually or through associations, now amounts to around a minimum of $1,200,000 annually. That figure is often greatly exceeded in case of a bad fire year. There is every indication that if the Federal Government continues this policy of cooperation the expenditures for that purpose by the States will materially increase; and, furthermore, that the amount of forests protection carried by private owners will greatly increase. In many States the result of this whole effort is now leading to legislation under which the owner of private land in the State is compelled to contribute on some equitable basis to the cost of protecting that land. There are now five States which have definitely adopted that policy in one form or another, and it is a policy which the Forest Service strongly encourages and indorses in our relations with the cooperating States.

The total area of forest land burned over annually in the United States has decreased materially since 1917. In that year the forest fires of which my service was able to obtain a record burned some 13,000,000 acres. The record for the area burned over in 1918 was 7,000,000 acres, in 1919 it was 5,725,000 acres, and in 1920 it was 3,558,000 acres. Undoubtedly of course, there were considerable areas burned over of which no record was obtained. In any event caution must be used in assuming from these figures that the decrease in the seriousness of the forest fires of the Nation has been as good as these figures would indicate; but there has undoubtedly been a tremendous gain in the reduction of forest fires, and it is undoubtedly true that the cooperative policy of the Federal Government under this legislation has had a great deal to do with that reduction.

There are about 317,000,000 acres of forest lands in the country privately owned, which should be systematically protected from fire. The estimated cost of such protection as the various State agencies have determined, each for its own locality, reaches a total of $7,601,000, or an average of 24 mills per acre.

To meet this estimated cost of complete forest protection in the country there is now available $3,406,000 annually from all sources, partly from State appropriations, partly from town and county appropriations, and partly from private expenditures; and to the extent of $400,000 from Federal appropriations. In other words, we are doing about 45 per cent of the job. There are still over 100,000,000 acres of forest lands in the country which receive no forest protection whatsoever and there are other areas where the forest protection now provided is incomplete and inadequate. I think that it goes without saying that systematic protection of the forest lands of the country from fire, particularly the lands that have been cut over and where the merchantable timber has been removed, but which now contains young growth or regrowth in various sizes, is the starting point in any systematic improvement for our forest situation. I think it goes without saying that that is a burden in which the public must share. But it is equally important that the owner of the land who is benefited by such protection pay an equitable proportion of this protection. The system on which the Forest Service is guiding this work—the idea that we are developing—is that with the cooperation of the Federal Government and the State, it is strictly up to the owner to do his part; and we will not permit the money made available by the Federal Government to be used to protect only valuable merchantable timber in the hands of private owners, as we feel it is distinctly their obligation to protect property of that character.

In every instance we insist that, where Federal money is added to the resources of a State or region, whether they be public resources or private resources or both, this Federal fund shall be used to extend the protection over the cut-over and regrowing lands in that State or region so as to give them must as efficient protection as the areas containing merchantable timber receive. In other words, we believe that the big interest of the National Government and the national taxpayer in this enterprise is to secure regrowth, not simply to protect the merchantable timber that remains, but to secure regrowth on the cut-over land.

On that basis we feel that it is a reasonable proposition for the Federal Government to contribute to this work within some definite limit. What that limit should be as far as my judgment of the matter goes, I would say this: That the Federal Government may properly assume something like one-fifth or one-fourth of the cost of general forest protection in the country providing the States and the private owners do their share and make up the difference. That is the general policy which has been followed up to the present time in the handling of this work.

No increase has been asked in this fund for the next fiscal year.

While very strong arguments could be presented to show the need for an increase, I advised the Director of the Budget, in view of the general situation, that if we could carry our work forward on the same scale as during the present year I felt the situation would be reasonably well met in view of the need for economy. Nevertheless, the demand for the extension of this work throughout the country as a whole is very strong. The fire protection organizations of the 26 cooperating States have been developed and are now organized on the basis of this Federal contribution, so that should the present cooperation be reduced or withdrawn, it would have a very disrupting effect upon the fire protection work as it has been built up in the 26 States of the country which have taken the most aggressive leadership in this matter.

One of the special advantages of Federal participation, even though the amount of money in an individual case may be small, is that we are enabled by inspection and by prescribing reasonable requirements to hold this protective work in all these cooperating States up to an efficient standard. We have made that very clear. Federal money can not be obtained unless the requirements are met, and the meeting of those requirements is not merely a matter of paper, but it is a matter of satisfying ourselves of the respective protective organizations of the State. In that way the Federal Government performs a standardizing and coordinating form of leadership that has proven to be of tremendous value.

The whole fire-protection service is improving, and I do not feel that it is improper for us to say that a considerable part of that protection is due to our cooperation in the 26 States and by the expenditure of this fund.

ALLOTMENT OF FUNDS—EMPLOYEES.

Mr. ANDERSON. Do you pay the people direct or does the State pay this money direct, or how do you handle that?

Col. GREELEY. The allotment is made at the beginning of each year to each cooperating State, and when the State submits satisfactory accounting evidence that certain amounts have been expended for the purpose of this law, the State is reimbursed by the Forest Service within the total of the allotment.

Mr. ANDERSON. Do you exercise any control over the purposes for which the money could be spent—the salaries that are paid?

Col. GREELEY. Yes, sir; we exercise direct control in accepting the expenses submitted by the State as justifying it to reimbursement under regulations covering this work; and then we supplement that by field inspection of the work in that State to satisfy ourselves that the money is efficiently used and efficient men employed.

Mr. BUCHANAN. Is one of your men carried on the roll down there to see about this service all the time?

Col. GREELEY. Not in each State; no, sir. We have, all told, five inspectors working in the Washington office and from the district offices in the West, each man covering the work of from two to five States.

Mr. BUCHANAN. Going from one State to another?

Col. GREELEY. Yes, sir.

Mr. BUCHANAN. To see that the States are carrying out the rules of the Federal Government?

Col. GREELEY. Yes, sir; to see that the requirements of this work are met.

Mr. BUCHANAN. And to see that they are living up to their agreements?

Col. GREELEY. Yes, sir.

Mr. ANDERSON. How does the pay of the State to their rangers and fire guards compare with that of the National Government?

Col. GREELEY. I do not think that there is very much difference. The year-around ranger employed by the States usually receives somewhat higher compensation than men filling corresponding jobs in the national forests, but the difference is not very great. The summer or temporary employment of patrolmen employed by the States will compare quite closely in compensation with the compensation of our similar employees in the same regions.

Mr. ANDERSON. Has there been any appreciable reduction in the wages paid to temporary employees in the forests since the beginning of the general industrial depression?

Col. GREELEY. There was some reduction this past year as compared with 1920.

Mr. HEADLEY. Last season was the first one in which we could make any reduction, and the reduction was made as far as it was deemed safe last summer, and it is expected that further reductions will be made in the spring. We are dependent on local labor conditions.

Mr. ANDERSON. Have you any general figures in your mind indicating the degree of that reduction, in percentage, last year?

Mr. HEADLEY. I should say not over 5 per cent.

Mr. ANDERSON. There appears to be a very material reduction in the pay of common labor all over the country. That seems to be reflected in these road contracts. It seems that that ought to be reflected in emergency and temporary work in the forests.

Col. GREELEY. I think the reduction would be considerably greater than 5 per cent for temporary labor employed on fire fighting or improvement work; but in employing fire guards for periods of from two to eight months we of course have to take men that are able to work on their own initiative, and in that class of what you might call skilled labor or higher grade than ordinary labor the reduction has not been so pronounced yet, but it is coming.

Mr. ANDERSON. I wish you would furnish the committee a list of the cooperating States and the amounts allotted to them by the Federal Government and the amounts spent by private concerns in those States for fire protection in so far as you have the data.

Col. GREELEY. I have that here, Mr. Chairman.

(The statement referred to is as follows:)

Cooperative fire protection with States under section 2, Weeks law—State, Federal, and town or county funds and Federal reimbursement percentage, fiscal year 1922.

State.	State appropriation.	Total Federal allotment, regular and slash disposal.	Total State and Federal.	Federal percentage.	Town or county funds.	Total, all funds.	Private expenditures, calendar year 1920.
Maine	$160,000	$24,550	$184,550	13.3	$7,500	$192,050	$25,400.00
New Hampshire	38,165	9,300	47,465	19.6	7,500	54,965	8,200.00
Vermont	8,945	5,650	14,595	38.7		14,595	4,000.00
Massachusetts	63,000	10,350	73,350	14.1	25,000	98,350	5,764.00
Rhode Island	4,000	625	4,625	13.5	3,000	7,625	
Connecticut	11,000	3,150	14,150	22.3	1,500	15,650	1,208.30
New York	162,500	24,550	172,950	13.1	[1] 4,250	172,950	90,000.00
New Jersey	35,980	6,550	42,530	15.4	10,000	52,530	4,716.96
Pennsylvania	500,000	27,500	527,500	5.2		527,500	2,824.93
Maryland	4,825	2,800	7,625	36.7	950	8,575	1,082.00
Virginia	18,200	18,200	36,400	50.0	[1] 5,700	36,400	5,140.20
West Virginia	7,000	7,000	14,000	50.0		14,000	10,000.00
North Carolina	[2] 14,250	14,250	28,500	50.0	[1] 5,250	28,500	615.00
Tennessee	11,700	10,500	22,200	47.3		22,200	
Louisiana	35,000	12,600	47,600	26.5		47,600	[3] 8,000.00
Texas	14,000	10,500	24,500	42.9		24,500	[3] 2,000.00
Ohio	5,000	1,050	6,050	17.4		6,050	
Michigan	140,000	25,000	165,000	15.2	16,700	181,700	[3] 5,000.00
Wisconsin	[4] 27,800	25,000	52,800	47.4	20,000	72,800	[3] 10,000.00
Minnesota	178,000	28,000	206,000	13.6	130,000	336,000	150,000.00
South Dakota	1,500	100	1,600	[5] 6.3		1,600	
Montana	24,200	13,700	37,900	36.1		37,900	12,878.13
Idaho, north	39,541	16,800	56,341	29.9		56,341	166,438.00
Idaho, south	8,097	3,150	11,247	28.0		11,247	
Washington	64,750	23,500	88,250	26.6	26,515	114,765	314,075.74
Oregon	42,500	28,000	70,500	39.8	9,920	80,420	224,743.64
California	49,800	22,750	72,550	31.4	13,500	86,050	13,977.00
Total	1,669,753	375,125	2,030,778		272,085	2,302,863	1,086,063.90
Administration		21,590					
Balance		3,285					
Total appropriation		400,000					

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[1] Included in State appropriation, although the sum indicated in column 6 is the estimated amount ultimately to be contributed or reimbursed to the State by towns or counties as the case may be.
[2] Tentative estimate, subject to change.
[3] Office estimates.
[4] To be revised.
[5] Direct disbursement plan continued.

Mr. ANDERSON. Have you anything further?

ACQUISITION OF ADDITIONAL FOREST LANDS.

Col. GREELEY. On page 249 is the next item, acquisition of additional forest land. Mr. Kneipp, will you discuss that item?

Mr. KNEIPP. Mr. Chairman and gentlemen, the item on page 249 deals with that part of the act of March 1, 1911—the so-called Weeks law—which authorized the purchase of land for national forest purposes. Merely as a side light on the importance of this work and the consideration given to the project, I might mention that between 1899, when the movement was first started, and 1911, when the act was passed, this project received the consideration of six different Congresses. It was the subject of 47 different bills and joint resolutions, of many debates on the floor of the House, of many debates in open meetings, of many investigations and discussions by scientific organizations, all of this culminating in the enactment of the law authorizing the purchase of lands.

As a result of that extended discussion a plan was formulated, closely following the enactment of the law, which contemplated the acquisition of approximately 1,000,000 acres of land in New England—the White Mountains of New Hampshire and Maine—and approximately 5,000,000 acres in the southern Appalachian region. The reason for selecting those two regions for the first application of the act was partly because the important watersheds west of the Mississippi River were already within the national forests; in the Lakes States the general level character of the country, nature of the soil, and controlling effect of innumerable lakes, and all that sort of thing, seemed to preclude the establishment of a relationship between the forest cover and the navigability of streams. So that that region at the time was not given the same consideration given the Appalachian or White Mountain areas. In the Adirondacks and Catskill Mountain regions the forests of the State of New York were believed to meet the situation. On the map here are shown in dark green coloring all the areas which have been established, and graphically the portions which have been acquired by the National Government.

I might mention here that this work has continued without a break since the enactment of the law, for prior to this year all the appropriations made were without year, so that the unexpended balances permitted uninterrupted prosecution of the work during the years for which no appropriations were made, so that this has been a continuing activity up to this time.

As a result of the work to date, there has been acquired or approved for purchase and money obligated to cover the cost thereof, a total of 2,047,718 acres.

Mr. ANDERSON. That is from the beginning?

Mr. KNEIPP. From the beginning of the work to date. The total cost of acquiring this property to date, either in money actually disbursed or obligated and ready for disbursement, is $12,178,396. The money that has been expended is not "water over the wheel," but to the contrary it represents, in our judgment, a highly profitable investment to the Government. Assuming that the 2,000,000 acres of land that have been acquired by the Government is worth to-day the average price which has been paid for the part purchased during the last two years, or in other words $2.77 an acre, and that the four and one-half billion feet of timber on these lands is worth the average price for which timber has been sold from them in the last two years, or about $2.80 per thousand board feet or its equivalent in other products, this property is worth about $6,000,000 more than its total cost.

Mr. BUCHANAN. Have you figured on that timber sold on the land being the timber that was most probably easily accessible and that very likely the timber that remains on the land is more difficult to get out or inaccessible altogether?

Mr. KNEIPP. That would be true in some cases, but a lot of it is readily accessible and a lot of it will be in demand as soon as economic conditions are such as to warrant it.

Mr. BUCHANAN. I just mentioned that to know whether you take that into consideration. I know nothing about it, but I know as a matter of fact a man who has timber that is accessible can sell it much better than if it were inaccessible.

Mr. Kneipp. These timber sales represent all the timber sold for the last two years and represent sales ranging in volume all the way from a couple of dollars' worth of timber up to the largest transactions, so it really constitutes a cross-section valuation of what this four and one-half billion feet of timber is worth now.

While this property stands now as a very valuable property, representing an intrinsic value greatly in excess of what it cost the Government to acquire it, the present situation is not such as to permit the Government to derive its fullest benefit.

In initiating the purchase work the National Forest Reservation Commission, through whom these purchases are made, decided it would not be advisable to limit negotiations to a single area at one time, because that would inevitably lead to prices going up in that locality. For that reason they approved 18 units, and they contract for purchases in these 18 units as opportunity presents. It was impossible to buy land in certain areas because the owners were cutting the timber. Owner A could not transfer it for five years; owner B was under contract for the sale of his timber for five years, and so on. That has resulted in the Government acquiring a sort of patchwork of land in each unit, among which are interspersed large and small tracts in private ownership.

The existence of these tracts naturally militates against the best utilization of the public lands because a purchaser from the Government, if he is going to operate on a large scale, must also arrange to get the timber on the privately owned land. While the Government is willing to incur expense to protect its land from fire and other forms of damage, the private owner may not be, and often he relies on the Government to protect his holdings, which it frequently must do. There is an additional hazard created by the private owner. For these reasons the situation is not as desirable as it ought to be. There are many questions that will not be solved until the Government has acquired a larger proportion of the private lands in these units.

The private owner's interest in these lands largely ceases when they are cut over—protection brings no immediate cash return. If the lands are to be acquired they should be acquired promptly. The Government's interest has increased because they are subject to damage by fire or other destructive influences, so that when the Government does eventually acquire them the delay has meant that every year until that time they have been reduced in value for the purpose for which the Government wants them.

Another reason that the Government ought to acquire them is that the cost per acre of protecting the acquired lands is higher than it ought to be, because of the intermingled private ownership. The same organization that now protects 40 per cent of a unit could protect 90 per cent. In many cases it would be to the Government's advantage to own it all.

Another consideration that might be of interest to Congress is that many owners of private lands in these units have shaped their logging operations or land operations with the idea of disposing of their land to the Government after they have removed the timber or after they have arranged their business so that it can be done. The discontinuance of purchases at this time without any prior warning or knowledge by these landowners would work a hardship; many of them have shaped their plans with the idea the Government would purchase their land at a fair value.

Another point connected with this purchase activity at this time is that as a result of the long continued work the public realization of——

Mr. **Anderson** (interposing). I am very willing to listen to why we ought to appropriate, but in view of the fact that there is no estimate before us I do not see any reason why we should go into considering what we should put in the record.

Mr. **Kneipp**. Shall I confine my remarks to what the estimate calls for?

Mr. **Anderson**. Yes.

Mr. **Kneipp**. The Book of Estimates provides $50,000 at the present time for this work. If that item is all that is appropriated for the coming year by Congress, the present force of 44 men now handling this work will have to be reduced to 17 men.

All purchase activities except the consummation of outstanding transactions would have to be closed up. The opportunity to buy many choice tracts of land at attractive prices would be lost. In that connection we have had offered for purchase and have examined, but have not purchased, 278,475 acres of land. The estimated value is $1,514,000, but we believe that would be very materially reduced by negotiations.

There has also been offered, but not yet examined, the offers being in various stages from clean-cut to tentative offers, 559,080 acres. On the basis of the same estimated valuation, which we believe to be very high, that would represent an additional value of $3,045,000. All of this land is in areas which have been established as national forests. In addition to that, study was made last fall of the probability of offers being made to the Government during the fiscal years 1922, 1923, 1924, and 1925.

Then, Mr. Chairman, as the situation now stands, there has been offered to the Government 838,000 acres of land worth somewhere between three million and four and a half million dollars. We have found that because of the existing economic conditions the prices now being made to the Government are much lower than those that have prevailed in earlier years.

At the last meeting of the National Forest Commission they bought 140,000 acres of land at an average price of $3.37, the lowest price of record. That is what inclines us to believe that this land will be bought at much less than the figures I have given you.

Mr. **Buchanan**. The estimate here is $50,000. You say it would reduce your force from 44 to 15?

Mr. **Kneipp**. From 44 to 17.

Mr. **Buchanan**. What would that force do if you make no appropriation for the purchase of land?

Mr. **Kneipp**. Many of them that could not be provided for in filling vacancies in other lines of work would have to sever their connection with the Government.

Mr. **Buchanan**. And then this bureau would have no reason for existence?

Mr. **Kneipp**. This is merely one item of work of the Forest Service.

Mr. **Buchanan**. What is the necessity for the $50,000?

Mr. **Kneipp**. To complete outstanding obligations.

Mr. **Buchanan**. Contracts already approved?

Mr. **Kneipp**. Land already bought, but not yet surveyed and the title not perfected.

Col. **Greeley**. To complete the purchase of land of this class, a survey is required, and an examination of the title, and the title put in shape for acceptance by the Government.

FOREST LAND PURCHASED WITH APPROPRIATION FOR 1922.

Mr. **Anderson**. How many acres were bought out of this $1,000,000 last year?

Mr. **Kneipp**. At the last two meetings of the commission they approved the purchase of 146,000 acres.

Mr. **Wason**. That is, out of the 1922 appropriation?

Mr. **Kneipp**. That was partly out of the 1922 appropriation and——

Mr. **Anderson** (interposing). That was the cost of it?

Mr. **Kneipp**. The average price for the last several months was $3.37 per acre.

Mr. **Buchanan**. I did not quite get what you said. Did you say that it had been approved?

Mr. **Kneipp**. The situation is this: The owner offers the land to the Government; a representative of the Forest Service examines the land for the Government, and if an agreement can be reached as to the value of the land, the man gives an option on it, and the proposition then is submitted to the National Forest Reserve Commission, of which the Secretary of War is chairman, and they decide whether they will approve it. If the proposition is approved an obligation is set up, and following that a survey is made, and after that follows an investigation of title and after that has been disposed of and the title determined as good, the deed is drawn and the deal is closed.

Mr. **Buchanan**. Then there is no question but the approval of title?

Mr. **Kneipp**. No sir. The commission approved a total of 146,000 acres at its last two meetings. Then in addition to that there may be some cases approved at earlier meetings that have not yet been consummated.

Mr. **Anderson**. I would like to find out the status of this $1,000,000; how much has been spent, how much has been obligated, and how much remains unobligated.

Mr. **Kneipp**. The unobligated portion of the $1,000,000 was $331,000 the last time a compilation was made.

Mr. **Anderson**. And there have been purchases, so far as you have record, of 146,000 acres. What did it cost?

Mr. **Kneipp**. The 140,000 acres approved at the last meeting cost $473,639, and the 6,000 approved at the preceding meeting, as I recall it, cost about $27,000.

Mr. **Anderson**. Is the rest of this accounted for in the cost of administration?

Mr. **Kneipp**. Some of it is; yes, sir. In addition to the purchases mentioned there has been $172,000 set aside for cost of administration and purchase.

Mr. **Anderson**. Does that mean that that $172,000 is a part of the $331,000 unobligated?

Mr. **Kneipp**. No, sir. It is separate from that; it is recorded as an obligation.

Mr. **Anderson**. I was under the impression that a part of the expense of survey and administration of these Appalachian forests, aside from the cost of the commission itself, was carried under some other item in this bill. Does not that reclassification item or some other item cover that?

Col. **Greeley**. No, sir. There is an item there requiring reclassification of all land acquired. It has nothing to do with the process of acquisition.

Mr. **Anderson**. Has it any reference to the unexpended balances?

Mr. **Kneipp**. This $331,000 includes the unexpended balances of all appropriations that have been made.

Mr. **Anderson**. That accounts for my inability to understand it.

Mr. **Kneipp**. The way it stands now is this, Mr. Chairman: Following the last meeting of the commission there was an unexpended balance of $331,000——

Mr. **Magee** (interposing). That will be available until the 1st of July?

Mr. **Kneipp**. Yes, sir. There were some small balances from previous appropriations; they were brought about by cancellation or modification of previous transactions. They were turned back. As to the last million dollars, that expires June 30 next.

Mr. **Anderson**. In this 278,000,000 acres which I understand has been examined and not approved, does that include land approved for purchase?

Mr. **Kneipp**. No, sir; that is in addition to all cases that have been approved.

Mr. **Anderson**. Is this million dollars a continuing appropriation or does it expire the 1st of July?

OLYMPIC NATIONAL FOREST.

DISPOSAL OF AND PROTECTION FROM FIRE OF WIND-THROWN TIMBER.

Col. **Greeley**. It expires the 1st of July. There are two other items, one on page 272 for emergency expenditures incident to the protection and disposal of wind-thrown and intermingled or adjoining timber on the Olympic National Forest. This appears to be a new item but was included in the first deficiency act of March 1, 1921. On January 29, 1921, a very severe hurricane blew over an enormous quantity of timber in a strip of country approximately 75 miles long and 30 miles wide on the west side of the Olympic Peninsula, in the State of Washington.

It is estimated that between five and eight million feet of timber were wind thrown by this storm. Approximately 15 per cent of that amount was within the Olympic National Forest and the remainder of it occupied State lands and private lands outside the national forests. The immediate effect of this blow down was to create probably the worst fire trap that has ever existed in the annals of forest lore or forest history in this country, as the stand of timber in that section was very dense; and while the blow down was not continuous in that district, this storm laid down from 10 per cent to 70 per cent of the timber on the area, and left an inflammable mass on the ground which it is impossible to picture. The area is one of the most heavily timbered portions of the West. There is an immense amount of timber that remains standing both on national forests and on the privately owned lands in the Olympic Peninsula. All of the interests got together in that section to agree on some plan for controlling the fire situation. An emergency appropriation of $100,000 was made in the deficiency act of 1921 to enable the Federal Government to do its part in the protection of the area. The rainfall on the west side of the Olympic Peninsula is very heavy and the natural growth of vegetation is very rank, so that it is a problem of keeping the fire out for five or six years until the area is revegitated and moist conditions reestablished so that exceptional fire hazard will cease.

The worst fire hazard was this last year, the summer of 1921, which is now passed, and we have carried that time through without any fire of consequence. The fires were all very promptly extinguished, due to the system of trails which had been constructed, the appliances which had been made available, and the control organization on the grounds. Of the original appropriation of $100,000 as a deficiency item it was found possible to save over one-half during the first fiscal year for which that money was available; $48,000 was actually spent out of the appropriation for 1921. The balance unexpended, $52,000, was reappropriated in the deficieny item for the present year, 1922. To carry the system of protection through the fiscal year 1923 will require $33,000, which is the estimate provided for in this budget. That money will be used to keep open trails, to keep up telephone lines, to keep open several roads, and to keep in commission a number of motor trucks which are equipped with tanks and gasoline pumps and hose, and also to maintain a special force of rangers and guards for very intensive patrol of that area.

The State of Washington has cooperated with the Forest Service in very effectual fashion in maintaining this work, and it is the most intensive forest protection, in my judgment, that has ever been one in the history of the world. We have even segregated the area, limited camping to absolutely one or two sites under very close control, and we have even in dangerous periods, under the authority of the State, prevented all hunting or use of the area of any kind whatsoever, because you can readily appreciate what would happen if a fire ever got started in that tangled mass of blown-down timber. If we can carry this work through for about three more summers the emergency will disappear. The necessary expenditures should gradually decrease year by year, and in the course of three or four years the need for the special item will undoubtedly cease altogether.

A certain amount of this money has been expended in estimates of the timber and an examination of possible means of salvaging the blown-down timber on national forest lands. It has not been possible yet to actually salvage any of this stumpage and the prospects of so doing are not promising. The timber is very inaccessible and a much larger quantity of blown-down timber is on State and private lands outside the national forests and more accessible than the forest timber. These considerations, plus the depression in the lumber business and low value of logs in that region make the possibility of salvaging the stumpage very low, but if it is possible we will do it.

Mr. **Lee**. How long before that timber will be of no use?

Col. **Greeley**. The spruce and hemlock will be merchantable for three or four years. This timber is spruce, hemlock, and Douglas fir. The Douglas fir will remain much longer, probably 10 or 12 years, although the sapwood on the outside of the logs will decay and become worthless, but the heartwood will remain there for 10 or 12 years. The main thing there is to prevent a conflagration from getting started, which would sweep the whole Olympic Peninsula.

Mr. **Magee**. Where did this blow down occur? Anywhere near Lake Pleasant?

Col. **Greeley**. I should say it was mostly south of Lake Pleasant.

Mr. **Magee**. In the vicinity of those lakes?

Col. **Greeley**. It began at a point near Grays Harbor and covered a swath running right north—in fact evidences of the blow down were seen over on Vancouver Island.

Mr. **Magee**. This heavy blow down was located near Lake Pleasant.

Col. **Greeley**. Mostly south of Lake Pleasant.

Mr. **Magee**. It was probably one of the best stands of timber in the United States.

Col. **Greeley**. Yes, sir; the best in the United States.

Mr. **Magee**. There are railroads within 12 miles of that timber?

Col. **Greeley**. The Spruce Production Corporation's railroad reaches the northern portion of this blown-down area. There are some operations there on privately owned land outside of the national forest.

Mr. **Magee**. They have got good roads out there. The roads cost $100,000 a mile. They have as good facilities there to get the timber out as anywhere in the country.

Col. **Greeley**. The Spruce Production Corporation railroad reaches the northern end of this blown-down area and the blown-down area runs from there about 75 miles to the south through country where there is no railroad.

Mr. **Magee**. The Chicago, Milwaukee & St. Paul runs into there.

Col. **Greeley**. They run from Port Angeles, west along the shore.

Mr. **Magee**. That is where they begin, and they run from Port Angeles down for about 25 or 30 miles, to within 10 or 12 miles of this blown-down timber.

Col. **Greeley**. My impression is that the road you are describing is the Spruce Production railroad?

Mr. **Magee**. No. The Spruce Production railroad branches off from the St. Paul. They wasted millions of dollars in a speculative enterprise in building this railroad from Lake Pleasant. They blasted through rock there a hundred feet high.

Mr. **Wason**. Did I understand you to say that you had tried to salvage this timber?

Col. **Greeley**. We have tried our best but it is impossible. The timber on the north end of the blown down, which can be reached by the Spruce Production railroad, can be salvaged; and some salvage operations have been begun. We are trying to interest operators in the best of the blown-down timber, but the cost of those operations are so great in comparison with the going value of logs and lumber that so far we have not been able to get any of the blown-down timber removed and I am not at all confident we will get any of it removed.

Mr. **Anderson**. You will just about have to give it away to get rid of it or have it removed?

Col. **Greeley**. I certainly would—I would be glad to get it taken off of the land.

FOR PROTECTION OF OREGON AND CALIFORNIA RAILROAD LANDS AND COOS BAY WAGON ROAD LANDS.

Mr. **Anderson**. We will take up the next item, which is on page 273.

Col. **Greeley**. This is a new item in our appropriation bill but has been carried for a number of years in the appropriations for the Interior Department. It is for protection of the so-called Oregon & California Railroad lands and Coos Bay wagon road land. The grant to the former Oregon & California Railroad Co. through the State of Oregon was revested in the United States in a decision of the Supreme Court several years ago.

Mr. **Anderson**. Has not that question been settled so that there will be no question about the revestiture?

Co. **Greeley**. There is no question about the revestiture in the Government. The Government has worked out its policy with reference to revesting. There have been certain questions involved in outstanding contracts made by the railroad companies to outside parties. I think all of those have been determined and I think the status of the land has been cleared and it simply remains to decide upon the policy for adoption by the Government for the disposition of the land.

Mr. **Anderson**. Are these lands not a part of any national forests?

Col. **Greeley**. No, sir. The lands occupy a special status as unreserved public lands—I should not say unreserved—they are reserved from appropriation or entry but they have not been placed in any permanent reservation. They are reserved public lands under the jurisdiction of the Public Land Office.

Mr. **Anderson**. How many acres are there in this tract?

Col. **Greeley**. There are approximately 3,380,000 that is timbered, aside from some additional areas of land that are not timbered. The location of the grant is shown by this purple line [indicating on the map] on the map of Oregon, in relation to our national forests. It shows that at its edges the granted land ran into the national forests. These lines run in here in checkerboard fashion, at every alternating section. About one-third of the timber land in the grant lies within the boundaries of the national forests. The remaining two-thirds lie outside the national forests in this north and south belt through the State of Oregon in a region which is still heavily timbered, where lumber operations are in progress, and where forest protective associations have been formed which embrace a great bulk of the privately owned land.

Now the Land Office, for several years, has had an appropriation of $25,000 for the protection of this timbered area. Because the Forest Service had a going organization on these national forests all around it, the Land Office requested us to assume that work for them, and for several years we have done so; and it was at the suggestion of the Secretary of the Interior that since it is forest protection work and since the Forest Service has an established field organization, it would be simpler and more clear-cut to have the item transferred from the appropriation for the Interior Department to the appropriation for the Department of Agriculture.

Mr. ANDERSON. How did you manage the appropriation? How did you do the work under the appropriation? Was the appropriation made to the Interior Department?

Col. GREELEY. The appropriations were transferred to the Forest Service by the Treasury on the request of the Interior Department.

That is the reason the appropriation is in this budget. The plan followed by the service in handling this protection has been as follows: Within the areas of the national forests as now established and where we must maintain our organization, we have extended the force sufficient to cover the revested lands outside our own jurisdiction. For the areas outside of the national forests, and lying a considerable distance from them, we have practically arranged with the protective associations, established under the State law of Oregon and functioning with the supervision of the State authorities, to include protection of these railroad lands along with the other lands, because that was the most economical way of doing the job. In other words, we had undertaken to protect these scattered railroad lands down the central portion of the belt, and we would have had to put an organization in the field, duplicating the orgnization maintained by these private protective associations, and we found it a scheme of money saving to contract with them to do this work to our satisfaction and subject to our inspection.

The Department of the Interior or the Forest Service has had to request several items of deficiency to make good the cost of this work for several years.

The actual cost of the work has varied from $32,510 in 1919 to $43,196 in 1920. The actual cost, of course, varies somewhat with the character of the season, but on the basis of our experience during the past four years when we have done this work in behalf of the General Land Office, the estimate of $35,000 is in our judgment the minimum with which we can assume the protection of these lands under ordinary climatic conditions. Exceptionally favorable conditions will reduce it; exceptionally adverse conditions will make it increase; but on the average conditions the $35,000 is necessary.

We are not asking for the item because we desire to do the work. It is an additional burden which we shall be glad to be spared, but since the Department of the Interior has asked us to do it, and it is in line with our work, we are prepared to undertake it. It is rather widely spread out, and the whole thing is a checkerboard situation, inconveniently located, so that it is not as economical to handle in a clean-cut way as we can handle our national forest work; but we are prepared to do the best with it that we can, and certainly the timber on these 2,380,000-odd acres should be protected until some permanent disposition of it is made.

Mr. ANDERSON. You do not have in any way control of the disposition of the land?

Col. GREELEY. No, sir.

Mr. ANDERSON. You do not control anything in respect to the purchase of it?

Col. GREELEY. No, sir.

Mr. **Anderson.** Whatever control of that there is is in the Department of the Interior?

Col. **Greeley.** Yes, sir.

Mr. **Magee.** Has the title of these lands been in litigation?

Col. **Greeley.** Yes, sir. The lands were granted to the railroad company.

Mr. **Magee.** Yes; I know something about that. The idea I had in mind is this: You speak of proposed legislation here and a decision of the court of appeals in the ninth circuit. When was that decision made?

Col. **Greeley.** I can not give you the date, but it was in 1916. This case was before the Federal courts for a long period, something like six years, and the court finally held——

Mr. **Magee** (interposing). I think that we have been making appropriations in the sundry civil bill for several years to complete this litigation?

Col. **Greeley.** Yes, sir.

Mr. **Magee.** The point I want to know—I did not know that the litigation had been completed yet, and I thought perhaps the case may have been carried to the United States Supreme Court.

Col. **Greeley.** The case has been settled by the Supreme Court as to the failure of the railroad company to comply with the terms of its contract.

Mr. **Buchanan.** I saw a notice in the paper not long ago that the Government won the suit.

Mr. **Magee.** That is the point I had in my mind, whether the title had been finally confirmed by any decision of the United States Supreme Court.

Col. **Greeley.** If the committee desires, rather than to make a statement that might be inaccurate on the status of the various decisions, I would be glad to run the matter down and give you a memorandum on that for the record.

Mr. **Magee.** You say in the circuit court of appeals in the ninth district—"the land revested in the United States by the act approved June 9, 1916, and the lands known as the Coos Bay wagon road lands involved in the case of the Southern Oregon Co. against the United States in the circuit court of appeals of the ninth circuit."

Col. **Greeley.** I think I can clear up that. The grant to the railroad company——

Mr. **Magee** (interposing). Yes; I am familiar with that. The only question in my mind was whether it had been determined.

Col. **Greeley.** The situation of the land owned by the Coos Bay wagon road grant I can not tell you. I will have to look that up and tell you about that. But the existing situation is that the Federal Government through the Interior Department now has jurisdiction over these lands. They are Government lands and consequently the Government has responsibility for their protection.

Mr. **Wason.** Can you state about how many acres there are?

Col. **Greeley.** Two million three hundred and eighty thousand acres, I think, of timber land.

Mr. **Anderson.** Is there anything further on this?

Col. GREELEY. Nothing further. The memorandum is as follows:

MEMORANDUM REGARDING THE OREGON AND CALIFORNIA AND COOS BAY WAGON ROAD LANDS.

Under the act of April 10, 1869 (14 Stat., 239), and amendment thereto, the Oregon & California Railroad Co. received grants of several million acres of lands extending north and south through the State of Oregon west of the Cascade Mountains. Because the railroad company did not comply with certain conditions of the grant whereby the lands were to be sold to actual settlers, a joint resolution was passed by Congress on April 30, 1908 (35 Stat., 571), directing the Attorney General to institute suit to declare a forfeiture of the grant. This was done and on April 21, 1915 (238 U. S., 393), the Supreme Court enjoined the company from disposing of the lands until Congress could provide for their disposition. By act of Congress of June 9, 1916 39 Stat., 218), it was directed that the company be compensated at the rate of $2.50 per acre for the lands revested in the United States, the lands to be classified and certain of them disposed of. This classification was made by the Secretary of the Interior. Suit has been filed by the Attorney General under the act of June 5, 1916, to determine the proper accounting of the moneys actually due the railroad company. A stipulation has been agreed to between the Government and the company and the case is now about ready for trial in the United States Court in Oregon.

It was contended that the provisions of the Coos Bay wagon road grant had also been violated by the Southern Oregon Co. which benefited by that grant under the act of March 3, 1869. The Attorney General of the United States had instituted suit to declare a forfeiture of the Coos Bay lands. While that case was pending before the Supreme Court of the United States, Congress passed the act of February 26, 1919 (40 Stat., 1179), to give to the Southern Oregon Co. similar terms to those prescribed by the Supreme Court of the United States in the Oregon & California land grant case. The act of 1919 appropriated $232,463.07 to be paid the company upon the execution of the deed satisfactory to the Attorney General of the United States revesting the Coos Bay lands in the United States. The company has executed this deed. The Coos Bay lands are also to be classified and disposed of under the provisions of the Oregon-California act of June 9, 1916.

MONDAY, FEBRUARY 6, 1922.

FOR INVESTIGATION OF METHODS FOR WOOD DISTILLATION, ETC.

STATEMENT OF CORNELIUS T. MYERS, RAHWAY, N. J.

FOREST PRODUCT LABORATORY, MADISON, WIS.

Mr. ANDERSON. The committee will hear Cornelius T. Myers, in reference to the item on page 103, which relates to the forest product laboratory at Madison. Please give the stenographer your full name and address.

Mr. MYERS. I have stated my name. My address is Rahway, N. J. About two years ago I started in doing some research work for some people in the automobile business, with reference to wood, and we found that we knew very little about wood, but that the forest product laboratory knew a lot, and they gave us a lot of assistance, and we have since supported any appropriation for the laboratory. We ran across a particular thing, and that is this, that wood changes its dimensions when it absorbs moisture. When it is cut it is full of water. We dry it out, and the more we dry it the stronger it gets, and the more serviceable it is for every use. It is like a sponge. It will pick up moisture unless we put something on it. We found varnishes which were being used to prevent wood from absorbing moisture were effective to a slight degree, but the paint manufacturers never considered the subject from that viewpoint. They wanted to furnish a good paint, and one that would stick. What happened to the article did not occupy their attention.

In structures which demand closely knit construction, that is a very important factor, because if wood absorbs enough moisture, and takes a permanent set, when it dries out the whole thing is loose. You have all noticed carriage spokes. When they absorb moisture they are solid, but when they dry out she will get loose. The minute she dries out she is loose. We can treat that thing in some way so it will not take up that water, and when we have worked out that problem we will have gained a great deal. For instance, when we have worked out that proposition desk drawers will not stick in the summer time, and become loose in the wintertime when the houses are dried out. This is important to everybody who use paint, because there is paint sold that does not give good value. What we would like to do is this. We would like to have you consider making a small appropriation for the forest product laboratory, because they know wood, and wood is a fundamental, in order to enable them to make a research, the object being to moisture-proof wood, by means of paint or some other coating. It is important in all sorts of structural stuff.

I picked up a shingle from my barn before I came down here, and I want to illustrate it to you, because this appeals to everybody who owns a house.

Here is a shingle with two holes in it. Small nails were driven through it. The moisture attacks those nails. It rusts the nails and swells the wood, and then it rubs the rust off the nail. Then she shrunk again. The rust was rubbed off, and then she rusted again. Then you have a little nail, that would not hold anything, with a big hole.

That wind storm last week blew that off. That is happening in millions of structures to-day, because we do not know what paint to use. The paint fellows know what paint will stick, but they do not know what will do it the most good, the surface of the structure.

We put this thing up to the various engineering societies, and wherever we have gone we have gotten a great deal of interests. I talked to Dr. A. H. Sabin, and asked him what he knew about it, and he said, "We do not know much about the point you are bringing up." We put it up to the engineering foundation, the National Research Board, and they are very much interested and are going to appropriate a little money, because it appeals to so many of our industries, and it is of vital importance to the wood conservation program, because the amount of wood you use in replacement is an enormous item. If you can make them last much longer you are going to save that timber.

We realize that this item is not in your budget. Mr. Winslow included it in his estimate some time ago, but it did not get by the various paring processes, and we realize that Mr. Dawes is certainly on the job down here.

We would like to see an appropriation put in there, so that they could put one or two good men on it, because they can get results in a year, and it will be of vast value to governmental departments, and other sources who want it and need it.

I do not know whether you gentlemen ever considered the subject from the standpoint that I make, but wherever I have gone I have found very little attention paid to it. It has the indorsement of the other gentlemen.

I do not represent any industry, except that I happened to investigate it for some automobile people who were building wheels. They could not make them stay tight, and it was the lack of proper paint.

Mr. ANDERSON. Did you get anywhere?

Mr. MYERS. Yes, sir. I took different blocks, maple, oak, hickory, birch, 1 by 1 by 4, and I sent them to five or six paint concerns, and told them what I wanted, and they started on what we did want. They weighed these things and put them in water, and then weighed them every day to see what paint gave the best protection to the woods from moisture, and we found that the stuff they were offering us was very poor. One concern made one which from its formula should not increase the price of the thing, but still make it serviceable for succeeding coats of paint, and it was six and a half times as good as when they started. That is an indication of the possibility.

I could not get very much enthusiasm from the paint manufacturers, because this will not do the paint manufacturers any good. They will sell less and cheaper paint. I did get the cooperation of Dr. Sabin here. He is a technical man, and appreciates that if this goes through, he will know what paint to buy and the manufacturers will know what paint to make.

Mr. ANDERSON. Is that a treated shingle?

Mr. MYERS. No, sir; I picked that up. It shows the physical effect. The boards on my barn doors are going the same way. I have not painted them often enough.

Every piece of window trimming, unless painted on the inside, will absorb moisture from the atmosphere. The forest products laboratory has done a lot on this. The paint men have all the data in regard to paint. What we want is to have the foresta products laboratory undertake a research, at the conclusion of which they will be able to say what paint is the most satisfactory. Moisture goes clear through all of the paint of to-day.

Mr. LEE. What wood is that, and how long has it been put on?

Mr. MYERS. About six years.

Mr. LEE. Do you know the wood?

Mr. MYERS. No, sir; I think it is a cedar shingle.

Mr. LEE. No; it is not cedar.

Mr. MYERS. I do not know. I am not a wood expert. We are not wood experts. Here is a man who is a wood expert. He knows so much about wood that, as compared to us, it is pitiable, because we are in the A B C's.

Mr. LEE. How much was exposed in laying this shingle on?

Mr. MYERS. I could not tell you. Working back and forth in that hole has made a great big hole in it and made the nail smaller. If we could put a reasonably cheap treatment on our wood that would prevent that moisture going through, we are going to save every householder in the country some money.

Mr. ANDERSON. It might be cheaper to get a rustless nail.

Mr. **Myers**. Yes, sir; you remember the old wrought-iron nail, and some used copper nails.

Mr. **Anderson**. They have a rustless nail now.

Mr. **Myers**. Yes; I use a lot of them. They try to sell it to the automobile people, but anybody putting on a tire, after these rustless lugs have rusted knows how much they are rustproof. This happens after they have been on the wheel only three or four months.

STATEMENT OF A. H. SABIN, 111 BROADWAY, NEW YORK, N. Y.

Mr. **Sabin**. I have been in the paint and varnish business for about 35 years, and I naturally know considerable about the paint end of the business, but nine-tenths of the people in this country live in wooden houses, and it is a belief when a wooden house gets 40 years old it is an old house, and its usefulness is pretty well gone, but in the town where I live, in Flushing, there is a house which was built in 1661, which is a better house than I ever expect to live in, an old wooden house. This Atlantic seaboard is full of 100 and 200 year-old houses, wooden houses.

If wood can be made to last like that; if it can be made to last twice as long as it does last, you are going to cut down the cost of housing of the general population one-half, and in the present shortage of houses, and with the increased price of lumber, and the prices are bound to increase as the forests get cut off, increasing right along indefinitely, I tell you there is nothing more important than doing something to preserve that lumber.

Here is a man in Montana who has a little house, which represents his savings of years, and he wants to keep it painted up, and he does not know what paint to use, and all the stuff he can get with regard to paint is some literature that was not even written by a painter, but by a hired advertising man, for the purpose of getting him to spend some money for some stuff that will pay the biggest profit to the manufacturers, jobber, and retailer, but they do not care anything about him. They want his money to keep the business running. This thing happens every day. A man sees some of our salesmen, and he says, "Now, I have got to have my house painted," and he asks them what is the best paint for it. Our man reports to the office, and we have some expert painters, old master painters, who go out and look it up, and they report and advise him. Master painters all over the country do that. There are 20,000 at least in the United States, and the amount of paint and varnish runs up to more than $300,000,000 a year, and they are experts to some extent.

They are not as a rule educated men, but they have a lot of experience, and they try to give good advice; there is no question about it, but all the men I have talked with agree with me that it is perfectly possible, that Hansel shall write to Washington and say he wants advice about painting his house, and somebody will send him back a printed questionnaire, which has some specific and definite questions, how it is situated, what kind of wood it is built of, when it was painted, and maybe ask him to scrape off a spoonful of paint, and by that time some experts competent to pass judgment on it will mark on that paper he sends back what should be done, and then a girl goes down and takes a farmers' bulletin, say 3027, and tells him just exactly how that house shall be painted. That is a possible thing to do, and it is perfectly obvious to every one of you, that is, a hardwood like hickory will require a different paint or varnish from an open grain wood like oak or a pitchy wood like southern pine, or will take a different kind of paint from white pine, and you will requite a different method of painting a house on the Gulf Coast in Louisiana, from what you will in Arizona, in the dry country, and a different kind in Duluth or down in Boston. You have got to have this thing studied and looked into.

The Forest Products people know a lot about wood, but they do not know anything about paint, and the manufacturers are primarily interested in selling any old paint, something they can get their money out of. They try to sell pretty good paint, because if they do they will get a good result and people will buy more of it.

It is perfectly possible to do this thing. I have been talking to some of the architects in New York, just before I came down here ast week, and I saw Mr. Jones, who is the secretary of the Structural Service Committee of the American Institute of Architects. The American Institute of Architects is the greatest organization of architects in the United States. I said, "What shall I tell these men from the American Iustitute of Architects?" He said, "You are warranted in saying this; we fully approve of having an investigation made. It is of the highest importance. We do not know anything more important in our line and we will support it in every way."

I was in Boston a few weeks ago, and I was talking with some of the Boston & Maine people. They said, "You can not get any money out of the railroads but you know the country is all spotted over every few miles with station houses which are wooden houses. If you can get your scheme going you can get those houses painted, any particular station house you like, with any particular kind of paint you want."

They got to buy the paint, and they would just as soon buy one as another, and if the Forest Products Laboratory asked them to paint a building with some particular paint, and make it up, and have their own painters who will do the painting; then the forest products people will have to do a reasonable amount of inspection, and you can make tests from New Orleans to Duluth, anywhere in the country, without any costs except the matter of inspection. They showed how they were interested. That was a voluntary suggestion.

Mr. Slem, who was the secretary of the Engineering Foundation in New York, talked with Mr. Kittrege, chief engineer of the New York Central Railroad. Mr. Kittrege said: "This is an important thing to be done," and he said about testing out on station houses: "Get your men out there and we can get the American Railway Association to put these men on their pay roll, say at $1 or $2 a year, and they can give them passes to inspect that railroad stuff," and that is another voluntary suggestion, showing the interests these men, big men, take in this kind of thing, and there is nothing that will be more important to the general public. As I tell you nine-tenths of the people live in 8 or 10 room wooden houses, and they paint them every few years, and they waste an enormous amount of money that way, and there ought to be something done to put a stop to it.

They ought to get their money's worth and they do not, because, in the first place, it does not exist. There is no means of disseminating it, and it ought to be done. It will cost a great deal of money. The amount of money involved runs up into the hundreds of millions of dollars a year, and $15,000 or $20,000 would hire two or three good men, and pay all their expenses and everything else, and they would begin to get results in a year, and they would keep on getting results for a term of years.

A paint experiment on the outside of a house or the inside either is not completed until that paint is worn out, because if it leaves the wood in such condition it can not be repainted, it is not good for anything now; until the paint is worn out and repainted, and the second coat of paint is half gone, it will take 8 or 10 years to get the final results, but you will begin to get results very soon, and that is something which is primarily for the benefit of the general public. There is a business interest, and the business interest is going to back it up. If you get that thing to work the way it will work they will get these houses painted better for less money. That is a bad idea to the paint manufacturer, and you are not going to get any help from those people. You will not from the people I am connected with, because they sell the stuff to the paint manufacturers. There you are. But I am free to say what I darn please. The president of our company said, "I do not care what you do, doctor, or what any other society does, but I do not want the name of the company dragged in it, because it will make trouble for us." I have been in this thing and I will tell you—I believe I know what I say.

If you want to ask any questions about this thing that I can answer, all right, go to it.

Mr. WASON. Did you ever know of anybody experimenting with wood, using linseed oil to keep moisture out of wood?

Mr. SABIN. It is used as a priming coat very extensively, and all priming coats are made of linseed oil. Linseed oil is very unsuccessfully used as a priming coat for varnishes; and alone it is not sufficient. Linseed oil will spread out to cover from 1,500 to 2,500 square feet to the gallon. That gets you down to a thickness of film to about 0.001 to one-fifteen-hundredth of an inch, and that is not thick enough to give protection.

Mr. WASON. Why not put on a second coat?

Mr. SABIN. Suppose you put on three coats. You have got to put on three coars of paint. Three coats of an ordinary paint—paint covers from 500 to 600 square feet per galio , and you have got 0.003 inches in thickness in coat.

A coat of paint is equivalent in thickness to about three coats of linseed oil, and three-fourths of the volume of that paint is linseed oil now. The reason you put a pigment into oil is to make a paint—there are three primary things which pigments do. In the first place it thickens it up so it will lay on in a thicker layer, just like mud is thicker than water. In the same place, a linseed oil film is porous. The particles of pigment are incredibly small, and they will accidentally obstruct those pores and make a less porous film, and, in the third place, the oil is comparatively soft material. It is soft, and a film 0.003 or 0.004 inch thick would not offer any protection, and the pigment is a hard mineral substance in its nature. It may be artificially made a solid, insoluble substance, and it gives hardness to the film. Certain pigments have some further advantages. They make the paint tougher, stronger, and all that.

Mr. WASON. To come back to my inquiry. Is it possible to treat a portion of wood with nothing but raw oil, so that it will resist moisture?

Mr. SABIN. It is not practicable to do it. If you could put that piece of wood into a tank of oil and let it stay there and soak, perhaps it would, but not by brushing on coats.

Mr. WASON. Then as the pores of the wood become filled by raw linseed oil you will get a moisture-resisting surface.

Mr. SABIN. Yes, sir; but not moisture proof. We have tried that. That has been tried out for 100 years.

Mr. WASON. Is it generally practiced?

Mr. SABIN. No. It is common to put on a first coat. The first coat does penetrate into the pores as much as it can.

Mr. WASON. With what company are you connected?

Mr. SABIN. I am connected with the National Lead Co. now. I am consulting chemist.

Mr. WASON. Do you find trouble with the painters in mixing the pigments that you furnish with poor oils and using them?

Mr. SABIN. Not so much as you would think. There is some adulterated oil on the market, but the present price of linseed oil—it is worth about 75 cents now. There is not much inducement to adulterate it. When it was up to $2 it was another story.

Mr. WASON. Why, that is the price of linseed oil prior to the war.

Mr. SABIN. And before the war 50 cents was a pretty fair price, and 60 cents was a good price before the war. It has been at 70 cents this past year, and has been sold as low as 60 cents in carload lots, in large quantities, but it is a little higher now.

Mr. WASON. You are referring to the wholesale price, are you not?

Mr. SABIN. Seventy-five cents in barrels. Of course, that is not in barrels delivered to you?

Mr. WASON. Was that a fair price for linseed oil in barrels last July?

Mr. SABIN. Yes, sir.

Mr. WASON. I guess I have got some trouble with somebody up home then.

Mr. SABIN. I bought it 25 or 30 years ago for 30 cents, and even below that, but not for a good many years. We used to do it prior to the war, that is, prior to 1914, we used to think that 50 cents was a rough price for oil.

Mr. WASON. What was your idea as to an investigation such as Mr. Myers suggested might develop?

Mr. SABIN. In the particular line that I am most interested in, that I know most about, you should find in the first place what is the best kind of paint, or the best three or four kinds of paint, perhaps for a particular kind of a house. Suppose you lived as I do, in a house which is about 30 years old, and it has been painted quite a number of times, and suppose your paint has gotten old and dry and hard, and it begins to show the wood through it. I know what I would do to paint that house. I did paint my house this last year, but I am not sure that I used the best paint that could be used for that purpose. I did the best I could.

Mr. WASON. You are speaking about paint?

Mr. SABIN. Yes.

Mr. WASON. Paint is a mixture as in commerce now, linseed oil and a pigment?

Mr. SABIN. Yes, sir.

Mr. WASON. And lead, or something like that, or some substitutes used quite commonly, are there not?

Mr. SABIN. There is a thing you want to know. They mix into white lead, for example, white zinc. The zinc men say that improves it. The zinc makes it harder. You do not want that zinc; you want part zinc and part lead, and it makes it better. I was brought up to believe that. I do not believe it any more. I have not any objection to believing it. It may be so. I would like to have that thing thoroughly settled. I want it done by somebody who has no interest in it. The paint men do not want to have a smell in this enterprise. I do not want anything to do with it. I am willing to help boost this thing until it gets going, but I do not want to be on a committee. The paint men ought not to have anything to say. It ought to be in the interest of the consumer and be done by people who have the proper training, and they ought to have the advice of everybody.

Mr. WASON. Speaking about your house; that is, the use of paint on a wooden structure?

Mr. SABIN. Yes, sir.

Mr. WASON. We will eliminate the manufacturer of lead and the man that sells linseed oil, and all that, and confine it to you as owner and occupant of that house. Can you tell this committee one thing that you have in mind that this investigation might develop that would be of practical information to you as the owner of that house, who was going into the market to have it painted?

Mr. SABIN. The majority of the people are ignorant of lead products and everything.

They should tell him in the first place what is the best kind of oil. If it was linseed, they should tell him if it should be put on raw, or whether it should have turpentine or a mineral turpentine substituted for it. They should then tell him what kind of a pigment to use, and how many pounds of pigment to a gallon of oil. That pigment might be a mixed pigment, not pure lead and pure zinc, but a mixture, like silica or a china clay, or something else, and if it was an outbuilding, like a barn, it might be an iron-oxide paint. He would get more for his money.

Mr. WASON. And he would get equally as good service?

Mr. SABIN. He would get better service.

Mr. WASON. Speaking about china clay: There was quite a bit of that used in pigments of paint, was there not, and is there not to-day?

Mr. SABIN. What is that?

Mr. WASON. In the pigment of the lead?

Mr. SABIN. Yes, sir. The lead companies sell white lead to the consumer, but they also sell it to the mixed paint manufacturers. The mixed paint manufacturer makes up a paint on some such scheme as I have outlined. He takes a certain amount of lead and zinc and silica, and of china clay, according to their different judgments, and make a paint that will cost as little as possible, and get good results from it, and then he puts in such a proportion of oil as is advisable, and that is all right, but no two of the fellows make the same stuff. They do not know, and I do not think many of them are very near right—I believe absolutely you are going to order a different paint for the second coat than the first, and a different paint for the third than for the second.

Mr. **Wason**. I get from your answer substantially this. You think so far as ready paints are concerned that an investigation would enable the Department of Agriculture to standardize those various paints for various purposes?

Mr. **Sabin**. They would be able to say what kind of a composition paint should be used in a particular place. Different kinds of places will use different kinds of paint.

Mr. **Wason**. You mean standardized for different localities?

Mr. **Sabin**. Yes.

Mr. **Wason**. A paint that will exist on a sea coast will be one thing, and in a mountainous country another?

Mr. **Sabin**. Yes, sir; it would. It would differ as to whether it was pitchy or nonpitchy wood, a whole lot.

Mr. **Lee**. To what extent is ochre used in paint?

Mr. **Sabin**. Not very much. It used to be used as a priming coat, but it was not satisfactory, and it is not used very much. There is not very much market for ochre now.

Mr. **Lee**. There is a great deal shipped from my country; that is the reason I asked.

Mr. **Sabin**. Yes; they use it for color and a filler, and there is a good deal of it used, but not so much as there was 25 or 30 years ago.

Mr. **Lee**. They used to use it in priming?

Mr. **Sabin**. Yes; it tends to peel. It could be used as a filler in linoleum, and that kind of thing, and maybe the total aggregate amount might run you up in tonnage.

Mr. **Lee**. I had an idea the mixed-paint people used it.

Mr. **Myers**. Some department specifications call for ochre.

I went from one paint manufacturer to another, and I went to people that build that different kinds of stuff, and none of them know. Some of them have opinions, but you can pierce the opinion of anyone you talk to if you have studied the question, because none have attacked the subject from the standpoint of protecting the stuff underneath. They are interested in selling the goods, and the longer they last the better. They have never considered the fact that moisture goes through three or four coats of paint. The experiments show that we can get five or six times as much resistance to the moisture with a very little change. It is an essential thing, and that is the fundamental thing.

I think Dr. Howe can substantiate that. That is the thing we are interested in. Everything will build up from that.

I am in the automobile business, a consulting engineer, and a few years ago we had 180 different kinds of steel; everything called for a different kind of steel. We have boiled it down to twenty-odd now. Here you have 580 kinds of paint, and you do not even know that the paint you are using is the best.

STATEMENT OF H. E. HOWE, NATIONAL RESEARCH COUNCIL.

Mr. HOWE. This project came to our notice simply as to whether or not it was a suitable project for scientific research, and I am speaking in regard to the problem, and not on the appropriation.

We know something of what has been done in the past regarding the testing of protective coatings, and I became interested in the fact as well as Mr. Flem, that most of the tests have been engineering tests, and not on the fundamentals that underlie what actually takes place. People have applied the same kinds of coatings without any regard to the underlying material. There have been a great many engineering tests of that type put on by various technical societies and paint manufacturers, where bits of iron, wood, and glass have been used under various conditions, and records kept and discussions made from the appearance. Oftentimes I have noticed that glass has been used, indicating the interest of the manufacturer was in the interest of the film. It is very seldom that glass is painted, universally, as it is not a paint material. There are many people in the Forest Products Laboratory who know about paint, and men like Dr. Sabin. There has been no coordination of their efforts. We believe a great many people will be interested in this, and we believe the Forest Products Laboratory is essential.

Our division of engineering and my own division of research extension have interviewed many people who ought to be interested. We have looked into what has been done in the way of testing, and we have come to the conclusion that it is worthy, from a scientific standpoint, to be carried on by the Forest Products Laboratory, and will leave certain fundamental principles, the change in dimension of materials we seek to protect. It will enable us to build up from that. We are speaking now of wood.

It is important in some structures to know how to protect iron, and that sort of thing—work that has been done by engineering societies and paint manufacturers—but no one has yet done the real fundamental research work, and we are interested in that phase of the problem.

Mr. ANDERSON. Are you spending any money on this now?

Mr. HOWE. Not of the Department of Agriculture.

STATEMENT OF CARLILE P. WINSLOW, DIRECTOR, FOREST PRODUCTS LABORATORY.

Mr. WINSLOW. During the war emergency the War Department and the Navy Department were interested in this from the standpoint of airplane propellers, and they put up some money for us so that we could make airplane propellers so that they would not twist and warp after they were made. They had great difficulty from that standpoint. An airplane propeller must keep its outline, and it is a problem of the conditioning of the wood and sealing it with something in order to get it in service. We did work along that line, and developed a coating suitable for that purpose by putting an aluminum leaf over the propeller and sealing it all with shellac, and as long as it did not become abraised it was a good coat.

We are spending $3,000 or $4,000, also furnished by the Navy Air Service, to continue work on modifications of that coating, to try to make it more permanent, so when the propeller is put in service this stuff will not knock off as rapidly as it does under present conditions.

Mr. ANDERSON. Is this quite expensive?

Mr. WINSLOW. Not expensive as compared with the cost of the propeller. If a propeller is costing you $75 or $100, and you spend $2 or $3 to get this on, it is well worth it from that standpoint.

We have made more or less complete surveys of the value of varnishes and paints on the markets, where you coat specimens with them and subject them to the soaking test. We have not found anything that is waterproof. Nothing is waterproof. Some of them are more water resistant than others. We have not found anything to put on wood that will keep the water out on immersing the wood.

We are spending no Department of Agriculture money on that, and we have not at any time.

The question of paints is a new field for us. We never felt that with existing funds, and with the other lines of work that we had under way we would be justified in getting into another field such as that without provision being made for it.

Mr. Myers and Mr. Sabin took it up with us several months ago, and have been in close contact with us, in urging upon us, in one way or another, to get into it as soon as we could.

Mr. ANDERSON. This would develop into quite a large research item?

Mr. WINSLOW. It well might, before you get through with it. Personally I would hope that we would be able to receive financial assistance from other organizations, such as the National Research Council, or institutions of that sort, that are allied with it, like the Institute of Architects and the Engineering Foundation; but my own experience of getting cooperative funds is that you nearly always have to have something new on that subject, so you can show them something as a lead, and that will be followed up, and it is pretty difficult with many of them to get them to make the start on it.

FRIDAY, FEBRUARY 3, 1922.

BUREAU OF CHEMISTRY.

STATEMENTS OF MR. W. G. CAMPBELL, ACTING CHIEF OF THE BUREAU OF CHEMISTRY; DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK OF THE DEPARTMENT OF AGRICULTURE; DR. F. P. VEITCH, CHEMIST IN CHARGE OF LEATHER AND PAPER LABORATORY; AND MR. D. J. PRICE, ENGINEER IN CHARGE OF DEVELOPMENT WORK.

REDUCTION IN NUMBER OF EMPLOYEES—INCREASES IN SALARIES.

Mr. ANDERSON. The item for salaries in the Bureau of Chemistry appears on page 118 of the bill.

Mr. CAMPBELL. There have been some individual changes in this item, Mr. Chairman. There is an increase of $2,500 in the salary of the chief of the bureau, from $5,000 to $7,500; and there are 16 new places, with salaries that aggregate $21,780, that have been added. That makes a total increase of $24,280. Thirty-one employees, with salaries totaling $28,300, have been dropped; three employees, whose salaries aggregate $3,320, have been transferred to the Division of Publications, and a mechanic at $1,800 has been transferred from the lump sum of the bureau and that fund correspondingly reduced.

Mr. ANDERSON. I wish you would give us a tabulation of the places dropped, the places added, and the places transferred.

Mr. CAMPBELL. We will be glad to do that. I might say in connection with this that the change is one that has been dictated by our own judgment of what would be the best administrative arrangement to make. There is one position in there that calls for an administrative assistant in lieu of a chief clerk, and that has been done because under the arrangement that we have in mind the chief clerk will not function as such. We have attempted to arrange the clerical work in groups, which we believe would be for the promotion of businesslike efficiency, and at the same time we have been able to effect economies in doing that. We will furnish you a tabulation covering the places dropped, added, and transferred.

The statement follows:

Summary of changes in statutory roll of Bureau of Chemistry.

Dropped:			
1	chief clerk	$2,500	
13	clerks, at $1,200 each	15,600	
1	laborer	720	
5	laborers, at $600 each	3,000	
1	mechanic	960	
2	messengers	1,680	
4	messenger boys, at $480 each	1,920	
4	laborers, at $480 each	1,920	
31	Total		$28,300
Add in lieu of places dropped:			
1	administrative assistant	2,500	
1	executive clerk	2,000	
12	clerks, at $1,300 each	15,600	
2	laboratory helpers, at $840 each	1,680	
16	Total		21,780
	Reduction		6,520
Add by transfer from lump fund for color investigations, which has been correspondingly reduced, 1 mechanic			1,800
	Net reduction of statutory roll		4,720

A reorganization of the statutory roll is submitted, 31 positions with salaries amounting to $28,300 are annulled and in lieu thereof 16 positions with salaries amounting to $21,780 are submitted, making a reduction of $6,520. One position of mechanic at $1,800 is transferred from the lump fund with a corresponding decrease in that fund. These changes will enable the bureau to conduct its work more efficiently by slightly increasing the salaries of a few positions and more economically by reducing the total expenditure for statutory salaries.

Mr. ANDERSON. Have you any vacancies on your statutory roll now?

Mr. CAMPBELL. There may be a few, but the changes we are contemplating in this way do not call for the creation of these places by taking advantage solely of statutory positions that are now vacant. We believe that we can effect this arrangement here, which will be a reduction in the total clerical force, by such vacancies as normally will occur between now and the time when this appropriation bill will go into effect—that is, if the changes are approved. We are not seeking merely to trade unused vacancies in such a way as to increase the number of higher salaried positions, because such vacancies as do exist now are normal to any particular period, but we expect to effect the reduction in the main by not filling vacancies that occur before this bill becomes effective.

Mr. ANDERSON. What work is performed by the laboratory helpers at $780 and $720?

Mr. CAMPBELL. They are dishwashers. They do a great many things required to be done in a laboratory, such as cleaning, washing dishes, getting supplies, arranging for storing materials in the laboratory, such as re-agents and the like. They do work of that kind which otherwise would take up the time of a chemist.

Mr. ANDERSON. What is the net effect of this reorganization, considering the character of the positions alone?

Mr. CAMPBELL. In our judgment, the effect of it will be in the promotion of efficiency in work. It will be a matter of handling the volume of clerical work to be done under a new plan, which is more compact and more direct for the purpose required. The clerical work of the Bureau of Chemistry is pretty varied. In addition to the clerical work due to laboratory and scientific operations, and the correspondence developed from that source, there is a tremendous amount of clerical work incident to the preparation and development of prosecutions under the food and drugs act. The net reduction under these proposed changes here amounts to $6,520. That will be the net economy effected by this modification.

Mr. ANDERSON. That includes all the changes in clerks, laboratory helpers, laborers, etc.?

Mr. CAMPBELL. Yes, sir. The addition of an administrative assistant here represents merely a change in title. As a matter of fact, it is a change of title from chief clerk to administrative assistant, because that is more accurately descriptive of his duties than the title of chief clerk.

INVESTIGATIONS OF THE APPLICATION OF CHEMISTRY TO AGRICULTURE.

Mr. ANDERSON. The next item, following the general language, is on page 120, for conducting the investigations contemplated by the act of May 15, 1862, relating to the application of chemistry to agriculture, etc.

Mr. CAMPBELL. That is the fund which supports all of our general agricultural chemical work, with the exception of the work appropriated for under the specific items which follow. This work is carried on in some instances by laboratories devoted exclusively to the work provided for under this item, and in other instances only by a portion of a laboratory, perhaps by only one chemist in it, or, again, perhaps, by only part of the time of a chemist, our purpose being to so coordinate the work of the laboratories that these investigations may be kept up in this way.

Mr. ANDERSON. Is this essentially fundamental research work?

Mr. CAMPBELL. Yes, sir.

Mr. ANDERSON. It is not regulatory work at all?

Mr. **Campbell**. No, sir; this is not regulatory work in any way at all. We are asking an increase of $5,000 in this item. Let me tell you just briefly of some of the work that is carried on now, and what it is proposed to do with the $5,000 additional.

MANUFACTURE OF SUGAR.

The carbohydrate or sugar laboratory is supported by this fund, and the work that they are now giving attention to under this fund is directed to the solution of some of the difficulties that have been found in the manufacture of sugar. In the beet sugar industry it has been found that where the beets have become damaged by frost it is not possible to get the yield of sugar from them that can be gotten from beets that are uninjured. That goes directly to a fundamental agricultural condition. It is our judgment that the failure to effect by crystallization a proper yield of the sugar there is due to a condition which has been brought about through the damage to the beets. This means the loss of an enormous amount of money in a year. It is recognized by the industry, and has been for some time, that if they could realize on the wastage that now takes place through their inability to get a proper yield, particularly from beets of this kind, there would be a tremendous economy effected to the advantage of the farmer and to the consumer, too, in the price of sugar. Therefore, we have devoted a part of the time of our carbohydrate laboratory to this work, which is supported by this fund. Very definite progress, by the way, is being made in it. We can not definitely say that we have effected a cure, but there have been tests and observations made in connection with sugar manufacturing plants which give promise, at least, of determining a line of attack that bids fair to correct that trouble pretty soon.

Mr. **Anderson**. Is this work carried on in cooperation with the industry?

Mr. **Campbell**. Yes, sir; with the industry generally, right from the time the beets are put out, and in cooperation with the Bureau of Plant Industry, which is interested in the cultural proposition or the growth of beets, the storage of beets, the manner of handling them, and finally with the sugar plant itself.

PROTEIN INVESTIGATION.

Another item that is paid for out of this fund is the protein investigation laboratory, that is supported wholly out of this fund. The protein laboratory has been investigating the protein content of food products, particularly of such products as velvet beans, corn, and the like. For a long time it has been recognized that the properties or ingredients that indicated the value of a feed product, for instance, would be such as proteins and fats, and that is reflected in the requirement of the regulatory laws of the various States that the percentage of protein and fats in feed products put upon the market be declared. Up until recetly it has been believed that the quantity of protein indicated the value of the feed product, but, as a matter of fact, the work that has been done in this laboratory has indicated that there is a wide variation in proteins themselves, and that the protein in one product does not give the same result in supporting life, reproduction, and the like, that proteins in other products will give.

Therefore this protein laboratory has made studies of the proteins of vegetables, and a result of its studies, we have been able to indicate wherein there exists a variation in the proteins of certain products, and then, by knowing the character of the proteins in other products, we are in a position to indicate the types of feeds that may be employed, so that the farmer may know the real value of what he is feeding to his stock. The farmer would know the real food value of the grain that he was feeding to his stock. That has been the purpose of the laboratory on that subject, and there have been several publications issued, the value of which have been testified to quite generally.

FRUIT AND VEGETABLES.

Another laboratory that has been supported entirely by this fund has been our fruit and vegetable laboratory, which now is stationed at Los Angeles, Calif., because we have been studying for a time some plan by which proper utilization could be made of the enormous amount of cirtus fruit that would otherwise go to waste. At the time this work was taken up there was really no attempt made to utilize that waste material or such attempt as was made was made in a small way by using it for preserves, and, perhaps, a little citric acid was being made. The last reports on that work show that as a result of the effort of that laboratory there has been something like 1,500,000 pounds of citric acid put out and something like 50,000 pounds of lemon oil made and 500,000 pounds of citrate of lime, as well as a great quantity of orange marmalade. The reports show that there are several very thriving industries in southern California based upon the utilization of this material that otherwise would have been absolutely lost.

One of the other pieces of work conducted at that laboratory has been the study from the chemical standpoint of the maturity of cantaloupes. One of the greatest difficulties that the cantaloupe growers have had to contend with was the matter of determining just when to pull their cantaloupes in order to put them on the market not too green and yet at the same time not to suffer the loss that they would sustain by waiting until they were too mature. That work has been carried on in connection with the industry and with other branches of the Department of Agriculture in attempting to determine the particular stage in the development of this fruit when it would be profitable for the farmer to put it on the market.

LEATHER AND PAPER.

Then there is the work done in the leather and paper laboratory in the study of leather conditions, including the matter of tanning, and the study of the methods employed by farmers in skinning hides, and the condition in which they come upon the market. A bulletin has been issued upon that subject by the department, and because of the excessive demand made for it a reprint has been necessary. That work is important for the guidance of the farmer in the preservation, preparation, and marketing of hides.

As occasion would permit, because the fund, as you must recognize, has not been a large one, we have had to assign a part of the time of these chemists to various questions as they arise from time to time. For instance, during the period of the war, when the importation of potato flour was shut off altogether, a small amount was spent by one of our men in studying the question of potato-flour production with a view to developing the industry in this country.

USE OF CORNCOBS.

There is another special item in this connection, and that is the work that has been done in an effort to determine some way by which corncobs could be advantageously used. There is now under way the construction of a factory for the utilization of corncobs. The principal chemical that is recovered from corncobs is furfural, which is used in the manufacture of insulating material and for the manufacture of phonograph records and the like. Bakelite has been used for that purpose almost exclusively. Corncobs furnish a source from which furfural can be produced at a small percentage of the present cost of producing it now.

I think those are the principal projects of work that have been carried on under this fund.

MANUFACTURING GAS FOR HEAT, LIGHT, ETC., FROM STRAW.

Mr. ANDERSON. You had a little item here under this general appropriation for investigating the possibility of making straw gas. Apparently that is to be cut out. Did you make any progress in those investigations?

Mr. CAMPBELL. I do not think that has been suspended altogether, and certain progress has been made. I will ask Mr. Price, who has had that work under his immediate direction, to speak on that.

Mr. PRICE. The work on straw gas has been limited somewhat on account of the lack of funds during the present year, and the bureau is spending only about $600 on the work. We have at Arlington some plants installed in which we have been able to make gas for heating and lighting purposes by the destructive distillation of straw, by placing the straw in a retort. We have not been able to go far enough to make it from any other products, but we feel that the same kind of gas, which is simply illuminating gas, hydrocarbon or carbon monoxide, can be produced from any set of this material. We have no difficulty in making the gas, and in cooperation with the University of Saskatchewan we were able to drive an automobile about 15 miles with a gas bag on top of the machine, the bag containing about 300 cubic feet. The Bureau of Chemistry has not made any progress in so far as compression tests are concerned. We entered upon this work primarily in connection with the burning of straw in the Pacific Northwest after threshing it, feeling that if we could develop a unit that could be operated on the farm, it might enable those farmers to make their own gas instead of depending upon some other fuel supply.

FOR INVESTIGATION OF VALUE OF CASINA OR YOUPON AS TEA.

Mr. CAMPBELL. The increase of $5,000 that we are asking is for the purpose of undertaking to determine the value of casina or youpon, which is a plant growing in the South Atlantic section, for tea. This plant has caffein properties that are comparable to those of tea. The little work that we have been able to do at no expense at all, simply by getting the owners of land in that section where casina has grown without cultivation, and where it is used in some places as a hedge, in the nature of a windbreak, to supply us with quantities of the plant, has indicated that a very satisfactory beverage can be made from it. It happens that the chief tea examiner in the bureau, who was formerly with the Treasury Department, had, before he came to the bureau, studied in Asia every phase of tea production, is perhaps better qualified than anybody else in this country to experiment in the utilization of this material so as to manufacture from it a satisfactory beverage. Five thousand dollars would not be at all adequate for carrying on this investigation if it were not for the fact that we have been able to effect a promise on the part of the owner of one of the biggest growths in South Carolina that he will make available to us such material as we need and give us sheds under which we can work at the time such work is required. We have also determined that it is possible for us to get second-hand machinery at only a nominal cost if not without charge entirely, and we believe that by having an additional $5,000 the work that should be done can be done to determine whether or not it is practicable to develop a tea industry in this country in so far as the utilization of casina for that purpose is concerned.

Mr. BUCHANAN. Do you use the berry or the leaf?

Mr. CAMPBELL. We use the leaves and also the entire plant, Mr. Mitchell told me; he said it was possible to use the twigs and it possesses an advantage in that way over the development in Asia because there they use ony the leaves. We believe it is possible to use the small branches themselves, as well as the leaves, and not make stripping necessary.

Mr. ANDERSON. Can it be grown cheaply?

Mr. CAMPBELL. I imagine so. It grows, apparently, in spite of any effort to keep it from growing. I imagine it can be grown in any quantity, and the place where this work is to be done that we have in mind is on a farm in South Carolina, where there is a tremendously big hedge, which will serve every purpose.

Mr. BUCHANAN. A hedge?

Mr. CAMPBELL. Yes.

Mr. BUCHANAN. There are thousands of acres of it in my country.

Mr. CAMPBELL. This has grown up in a cluster of trees, which will make it easy for us to get all we want without going any distance to get it, and that seemed to be the nearest place we can work, so as not to be far out of Washington, and thus reduce traveling expenses.

Mr. ANDERSON. Is this stuff palatable?

Mr. CAMPBELL. It makes a very delightful beverage. I have drunk some of it. Mr. Mitchell made some of the tea at the office and distributed it through the bureau just for experimental purposes. It is a very delightful beverage. I will say frankly that I do not care for it to the extent that I would a cup of tea; but, after all, it is a matter of taste. Mr. Mitchell was at the disadvantage of just trying it in a crude way, and we do not know what will be the result if he is able to manufacture it under conditions that would be comparable with those under which imported tea is manufactured.

I may say for this whole item that, in my judgment, it represents a rather modest total for all of the agricultural investigational work of a chemical character that is to be carried on in the department. We have employed economy in every possible way to make the money go to the farthest extent, but should an occasion arise right now that would make it imperative to consider some question of an agricultural sort, where chemistry was one of the means for determining a proper and intelligent solution of that question, we are not in a position to undertake the expense that would be involved in doing it. I am merely mentioning this fact to show you that $70,000 or $75,000, if that is appropriated, which will make possible the carrying on of this tea work, is, after all, a rather modest sum of money for the things we are attempting to do under it.

COLLABORATION WITH OTHER GOVERNMENTAL DEPARTMENTS.

Mr. ANDERSON. If there are no further questions, we will take up the next item.

Mr. CAMPBELL. The next item is for collaboration with other departments of the Government desiring chemical investigations. That money has been spent in cooperation with the War and Navy Departments and also in cooperation with the Post Office Department. The Bureau of Chemistry is continually receiving requests from other departments for the making of chemical analyses of products they have to consider. The supplies purchased by the Army, the Navy, and the Marine Corps are obtained on specifications that are adopted. The bureau is consulted in connection with the determination of those specifications and is called upon in a very great measure to make examinations of samples of the food products at the time the shipments are submitted in order to determine whether or not they comply with these specifications. The bureau also cooperates with the Post Office Department in the handling of the postal fraud order laws in so far as those relate to drug products. They have done a great deal of work in the prevention of the use of the mails for the advertisement and sale of nostrums by the issuance of fraud orders, but in every instance it has been necessary to determine the composition of a product and whether or not it was capable of producing the results indicated on the label or by representations that had been made through the mails. We have made the analyses of such drug products. For that work it has taken every cent of the fund and sometimes a little more.

Mr. ANDERSON. The question always arises in connection with the Bureau of Chemistry as to the line of demarcation between the work which is done by the Bureau of Chemistry and the Bureau of Standards. I wonder whether you can state briefly just where that line is.

Mr. CAMPBELL. The Bureau of Chemistry has taken this position, that the field in which it should work, in addition to that involved in the enforcement of regulatory laws assigned to it, is that of agricultural chemistry. The work of the Bureau of Standards does not relate and should not relate essentially to agricultural operations. Agricultural chemistry concerns itself, for instance, with the growth of a proper type of sugar cane on a suitable type of land, the particular grade of cane that should be grown in certain sections for the purpose of enabling a farmer to get a maximum yield, making it possible to plant intelligently and get the greatest return out of this crop.

Agricultural chemistry, however, is not limited to just cultural operations, but extends to a study of those technological processes involved in the manufacture of agricultural raw material. For instance, in sugar manufacture if chemistry can be employed in the determination of better technological methods for the utilization of farm products it redounds undoubtedly to the advantage of the farmer and to the consumer alike, and it is our judgment that agricultural chemistry should carry through the entire field from the cultural stage up to and through the completion of the technological work involved in the manufacture of finished products from agricultural raw materials, and that that is properly the sphere of the Bureau of Chemistry. The Department of Agriculture has in its various bureaus the equipment to study properly agricultural questions in all of their phases. If the solution of some manufacturing problem involves a study of the agricultural development of the raw material, this can not be undertaken by any organization outside the Department of Agriculture without duplicating work already done or establishments already in existence. There have been some conflicts between the Bureau of Standards and the Bureau of Chemistry in this matter. Certainly it is our desire to prevent and to avoid that type of duplication in work which will result from such overlapping operations as might take place by some other governmental institution entering a field which is agricultural in its character and which has been preempted, in so far as the money available would permit, by the Department of Agriculture. Does that make it plain, Mr. Chairman?

Mr. ANDERSON. I just wanted to get something in the record on the subject.

Dr. BALL. To supplement what Mr. Campbell has said, we submit that the function of the Department of Agriculture extends to those processes of manufacturing agricultural products where the problem involved traces back to the agricultural end. For example, take the manufacture of sugar. The problems in the manufacture of sugar are all problems arising through the different kinds of soil and different methods of handling the sugar beet. The problem in one region may not exist at all in another region where they use a different method of cultivation or have a different type of soil. It may be that in some regions they can not manufacture beets into sugar because there is something that has been taken up by the beets, and thus the problem is traced right back to agriculture.

Mr. WASON. Why should not the line of demarcation be substantially this: The growing of the sugar beet, the adaptability of the soil, and the condition of the beet until it becomes a finished product are purely agricultural problems, but when the beet is grown, has ripened, and is ready for the market it becomes an article of commerce. When it is used for the purpose of extracting sugar, or for other purposes, it becomes at that point an article of commerce rather than a product of the farmer, because he has parted with it.

Dr. BALL. He may have parted with it, but it is still a problem of agriculture if there are problems to be solved before it is possible to develop the industry. For instance, two-thirds of our utilization work is carried on because without this work it is impossible to carry on agricultural work. If you can not make sugar out of the sugar beet you are blocked from the development of the sugar-beet industry, so that its utilization is just as much a problem of agriculture, just the same as marketing is an agricultural problem. When a farmer raises a bushel of wheat his problem has only begun, because he must see that there is a system of marketing his wheat that will yield him a return from it.

Mr. CAMPBELL. The difficulties that are encountered in a matter like the technological questions involved in the manufacture of sugar are not divorced at all from the primary agricultural and cultural phases. There the difficulties are immediately traceable to the development, growth, and handling of the sugar beet, and you can not intelligently study the difficulties at the factory in the manufacture of sugar without going back to the very foundation of this thing, which is agriculture. The study of these problems by any agency outside of the Department of Agriculture will mean necessarily a duplication of the fundamental activities of the Department of Agriculture.

Mr. WASON. By way of illustration, a part of the province of the Agricultural Department is to enlarge and foster the growing of cotton, is it not?

Mr. CAMPBELL. Yes.

Mr. WASON. Do you follow that cotton through to the manufacturers in my State and see how they operate?

Mr. CAMPBELL. We have not done that in so far as the Bureau of Chemistry is concerned, because there are no chemical problems involved of which we are aware.

Dr. BALL. We would not consider any process in the manufacture of cotton as a part of our province which did not involve some defects produced by some cultural system or some soil condition; but if, on the other hand, a certain large area in Texas was producing cotton which, on account of some soil conditions, contains fiber that was of less strength than in some other regions, we might wish to go into the problem of testing that fiber in order to find out where the soil areas were, and in order to bring about a correction of that condition we would be absolutely compelled to go far into that field.

Mr. WASON. Is not the very thing you speak of an everyday occurrence in the life of a manufacturer of cotton?

Dr. BALL. But if it is traced back to an agricultural problem it will never be solved until it is tied——

Mr. MAGEE (interposing). Your fundamental problem is to determine whether the soil is suitable to produce cotton.

Dr. BALL. Yes, sir; or how to change that soil.

Mr. MAGEE. Whether there are some substances lacking that should be in the soil?

Dr. BALL. Yes; or something there that should be removed or counteracted. If you bar us from the problem of testing the textile strength of that cotton, or whatever it lacks, you bar us from the possibility of solving that problem.

Mr. MAGEE. That examination would be incidental to your determination of what properties should be in the soil in order to produce an acceptable cotton.

Dr. **Ball**. Yes; and if we go into a sugar factory and find they can not crystallize their sugar because there is some substance in it, we can not go back and solve the matter agriculturally unless we find out what that substance is or what substance is lacking in the soil.

Mr. **Magee**. It all pivots around your determination of the qualities of the soil.

Dr. **Ball**. No; take another case that comes right in this bill, and which we will take up later. The people of the South manufacture cane sirup, but on account of the fact that their processes are crude they have not been able to make a market for it. Sometimes it sours, sometimes it is too watery, sometimes it is too thick and it crystallizes.

Mr. **Buchanan**. It sours unless you put something in to prevent that.

Dr. **Ball**. They have worked out a process——

Mr. **Buchanan** (interposing). I have made many barrels myself.

Dr. **Ball**. They have worked out a process to correct this. Now, it was necessary to work out that process and to correct this deficiency in order to establish an agricultural industry, and if it had nothing to do with the establishment of an agricultural industry we would consider it out of our field.

FOR INVESTIGATION OF RAW MATERIALS FOR COLORING, ETC.

AID TO DYE INDUSTRY.

Mr. **Anderson**. If there is nothing further on this item, we will take up the next item on page 122, for investigation and experiment in the utilization, for coloring, medicinal, and technical purposes, of raw materials grown or produced in the United States, etc.

Mr. **Campbell**. This is to support the so-called color laboratory for which provision was made during the period of the war. You will recall that when the war broke out intermediates which were used by the color manufacturers of this country were no longer available. Up until that time the color factories of this country had not manufactured their own intermediates; they had depended almost exclusively upon Germany for that supply. The purpose of this appropriation originally, then, was to take up, in cooperation with the factories themselves, methods of securing those intermediates from the crudes, which eventually serve as the basis for the manufacture of dyes. With reference to some of the work that has been done in that field—and I believe it has been referred to heretofore—a method was devised for the manufacture of phthalic anhydride, which frequently was not available at any price at all. The quotations ranged at different times to as much as $7 a pound. That is a very important intermediate in the manufacture of our dyes. An improved method over that employed in Germany was worked out in this laboratory, and the fact is that right now, after the war is over, American manufacturers are putting that product in competition with Germany in Switzerland and enjoying the advantage of an export traffic in it.

Those were questions that related primarily to tonnage and that was essentially the thing upon which we felt a need for working at that time, and most of the work was done in that way. You will notice that a decrease has been made in the estimate, and we have made that decrease because we believe that the best effort on the part of this laboratory, and the equipment we have at the Arlington Farm, can be directed not so much for the determination of improvements from the standpoint of tonnage, because the color factories in this country have been put on a basis where they can employ a corps of chemists of their own to study those things more intensively than we hope to do, but for the purpose of determining methods by which the identification of colors can be established. One of the troubles we have now is the matter of distinguishing accurately one color from another, the matter of determining whether or not the integrity of a particular dye is what it should be or whether it is impure through the presence of other dyes. It so happens that these color products act in a queer way. You put them together in one way and you will get one result, and you put the same thing together in another way and you will get an entirely different result.

It seems that there has been a prevalent opinion that Germany possessed very great and profound knowledge about the fabrication of dyes that nobody else knew, but chemists nowadays have come to the conclusion that such knowledge as they possessed was not the result of that kind of study which involves the identification of the dyes but that they had a rule of procedure by which they got certain results, and that they adhered definitely to that throughout. There has never been worked out and published anything at all with respect to the proper analyses of dyes or their identification. Our laboratory is undertaking now to do that very thing and make it possible for an accurate determination to be made as to whether you are getting a dye that is offered under a definite name or under a definite representation. In addition to that, we are also going into a study of fabrication in so far as it may relate to dyes used as biological stains. Heretofore, the scientists of this country have been dependent upon the dyes that were imported from Germany, and, as a matter of fact, the only satisfactory dyes for that purpose that can be had are remnants of the supplies that were imported into this country before the war. Now, the large manufacturers of this country are not particularly interested in that because it is not a tonnage proposition. There was one firm in Germany that supplied nearly all of such dyes throughout the entire world.

Mr. MAGEE. Germany had a monopoly of the dye industry before the war.

Mr. CAMPBELL. Without doubt.

Mr. MAGEE. And she wants it back.

Mr. LEE. She has a monopoly now on certain colors, has she not?

Mr. CAMPBELL. I dare say she has, but we are in a position now to undertake the manufacture of almost any color that is put out in Germany, although I will say that with some reservation.

Mr. MAGEE. Do you mean fast dyes?

Mr. CAMPBELL. You are getting into the art side of it, Mr. Magee, that I do not know about.

Mr. MAGEE. I am very much interested in what your views are as to whether or not we can compete with Germany in this matter.

Mr. CAMPBELL. Well, I would not undertake to say that we can at the present time. I do not think we can.

Mr. MAGEE. In other words, we must take care of the industry.

Mr. CAMPBELL. I think so.

Mr. MAGEE. And it should be taken care of.

Mr. CAMPBELL. I think so. The principal biological dye which had been used throughout the entire world before the period of the war was supplied by one German firm, and the only available quantities we have for scientific use are remnants of the supplies that were imported into this country before the war. Certain concerns in America have undertaken to manufacture it, but not because there will be extensive profit in it, as it is not a tonnage proposition; but those dyes have not been satisfactory at all. Our idea now is to make possible the manufacture of dyes for every purpose, scientific and technical, in this country, and just as good dyes as can be manufactured in Germany. So our work is not so much on the tonnage basis now as it is for working out something that is required by the scientists of the country and determining methods by which we can identify different dyes when they are offered for sale. That is the reason for the decrease in that appropriation.

Mr. ANDERSON. Is this appropriation devoted entirely to this color work?

Mr. CAMPBELL. Yes.

INVESTIGATION INTO THE METHODS AND MANUFACTURE OF SIRUPS AND SUGAR.

Mr. ANDERSON. We will take up the next item on page 123, for the investigation and development of methods for the manufacture of table sirup and sugars, and of methods for the manufacture of sweet sirups by the utilization of new agricultural sources.

SIRUP FROM SWEET POTATOES.

Mr. CAMPBELL. This proviso appears in this item:

> That $12,500 of said amount may be used for investigation and experimenting in production of sirups, sugar, starch, dextrine, and other commercial products from the sweet potato.

Let me speak to that point first. We have, as the result of the availability of that fund, actually worked out methods for the manufacture of a sweet potato sirup. That work was undertaken, after first being studied on a laboratory scale, on a factory scale in Fitzgerald, Ga., last year. The sirup was submitted to various agencies for comparison and testing, to determine whether the finished product was what it should be in order to make it a commercial possibility. Further work has been done by the laboratary and we believe we are in a position to manufacture a sweet potato sirup that will be an improvement over the product that was turned out on a factory scale last year, and our men are now in Fitzgerald, Ga., repeating that operation as a result of cooperative arrangements with a concern there that has facilities for having the work done, and that permits us to do it at a minimum cost. We are not asking for a continuation of that item, because such work as we have to do will be completed this year.

CANE SIRUP.

Our efforts in regard to table sirup have been devoted largely to the establishment of manufacturing methods through the use of invertase. Just as Dr. Ball has stated, the great difficulty in manufacturing sirup in the South heretofore has been the question of not concentrating it sufficiently to prevent fermentation, or, on the other hand, allowing overconcentration, which would result in crystallization. I may say that cane sirup is not the commercial product it should be. It is a delightful product, but cane sirup is used more largely for blending in with other products than should be the case. I think that has largely been due to this condition that I refer to, and that in time either ferments or crystallizes, and becomes thereby an unsatisfactory commercial commodity. Then there has been the inability to manufacture a product of a stabilized type because of the fact that it is made under varying conditions by a great number of people, and largely on a small scale. The use of invertase has made possible the concentration of this product to a point that gives a satisfactory consistency and prevents fermentation and crystallization.

Mr. BUCHANAN. Even through a hot summer?

Mr. CAMPBELL. Yes.

Mr. LEE. That is, if it is put in a tight can?

Mr. CAMPBELL. It is not necessary to put it in a tight can.

Mr. BUCHANAN. Of course, if you put it in a tight can you do not need any process, but I am speaking about putting it in a barrel and keeping it through a hot summer.

Mr. CAMPBELL. It would not keep through a hot summer under old conditions, but it will not ferment if the methods we have established are used.

Mr. BUCHANAN. What do you put in?

Mr. CAMPBELL. Invertase. That is an enzyme that acts on the sucrose, which is the basic sugar in products of that sort, and splits it up into sugars which do not so easily crystalize. This permits the production of a noncrystalizing, high density sirup which does not readily ferment.

Mr. BUCHANAN. Does it affect the taste in any way?

Mr. CAMPBELL. It does not. There have been, in certain sections of the South, the practice of manufacturing these cane sirups in a way to avoid their fermentation by adding acid, and that always does affect the taste. Some of the biggest concerns in the South have used acids, but as a result of the work we did, particularly through this past year, in trying to foster the use of invertase, they have abandoned the use of acids and are using invertase.

Mr. BUCHANAN. Did you ever have occasion to investigate whether or not the treating of raw cane with sulphur fumes before it is boiled down to sirup, affects it in any way.

Mr. CAMPBELL. It does, and that has been the practice that prevailed, and it so happens that there are certain sections in the South that prefer sirup that has been sulphured. I think that in the vicinity of New Orleans sulphured sirups are preferred to those that are not, but to me there is something disagreeable about the flavor of such a sirup.

Mr. Buchanan. Is there any process by which you can make the sirup brighter?

Mr. Campbell. You are now right at the very crux of this project. I think the one reason why we can not expect to immediately make as big an industry in the growth and manufacture of cane sirup in the South as will exist is the inability to put the product out in stable types, principally from the standpoint of color and flavor.

We believe that clarification is the basic question to be solved, and we are working on it for the purpose of making possible the manufacture of a product which will be consistent in its character. From our observations in this particular work, I think that it would be a blessing to the South if there could be some encouragement for the more extensive growth of cane for the purpose of making cane sirup. It would be, in our judgment, a more profitable use of some cotton land at the present time. It so happens that the operation is at a season when it can be done advantageously, but it will not be profitable so long as there does not exist a good market for it, especially in the North. It will be possible to establish such a market only when the product can be put on the market in a stabilized form.

Mr. Buchanan. A market can be established for it whenever you can invent a process by which it can be made so that it will not ferment, and a process by which its taste will not be affected, and, at the same time, give it the color of a good merchantable sirup?

Mr. Campbel. Yes, sir; and the matter of clarification is now the main point.

Saturday, February 4, 1922.

ENFORCEMENT OF FOOD AND DRUG ACT.

Mr. Anderson. We will take up this morning the item on page 124, which is the item for enabling the Secretary of Agriculture to carry into effect the provisions of the act of June 30, 1906, for preventing the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein.

Mr. Campbell. Mr. Chairman, this is the appropriation out of which the expense of the regulatory work of the bureau is defrayed.

The food and drugs act applies to foods and drugs whether it is for man or other animal, and that includes stock feed, in both interstate and import traffic.

The undertaking of enforcing that law satisfactorily and effectively now is quite a different proposition from what it was when the law was first enacted. It is becoming more difficult and more expensive to do it from year to year. When the law was first enacted it required no effort at all on the part of the Government to detect violations because practices had prevailed up to that time which represented nothing more nor less than downright falsehood with respect to representations which were made on the label and otherwise in the sale of foods and drugs.

There was a period which followed the enactment of the law through which the big percentage of manufacturers voluntarily brought about an adjustment of trade practices and methods of sale so as to comply with the provisions of the law. There is always, of course, an element among manufacturers to whom honest dealing does not make a convincing appeal, and to whom you must apply the terms of the law in order to protect the public and to eliminate unfair competition. When the representations were of such a false or untruthful kind, such as to misrepresent the identity of the product, it required very little effort on the part of our chemists to establish a genuine infraction of the act. But as a result of the work through these years since the law was enacted the types of violations have been gradually reduced until now we are confronted with a class of cases which may be regarded as coming within a debatable zone; that is, between the point where there is an unquestionable violation of the law and where there is an unquestionable compliance with the law. This type of traffic has given us great concern because in the beginning it was uncertain what the requirements of the law were, but court decisions which have been rendered have elucidated the terms of the law and have made it possible to know more definitely what its exactions are. This has clarified the situation somewhat. But the kind of sophistication which is practiced now is one that is harder to detect than the form of adulteration which originally existed.

The impression might prevail that all this appropriation was used for direct regulatory operations, for the maintenance of the field organization which has to do with the collection of the samples, their examination in the laboratories, the development of prosecutions and the like, but it is not all used for that purpose.

As an illustration, we will take the fruit-preserving industry. Originally and before the food and drugs act was passed a product labeled "Pure Strawberry Preserves" could be put on the market which would be wholly or in part substituted by a cheaper product or some other and cheaper food material. That involved only the determination of the identity of the product in order to properly enforce the provisions that applied to it. But that is not the question now.

There is in all fruit products a certain material that has jellifying properties called pectin. It is, for instance, present in a lesser degree in such fruits as strawberries, but prevails in such products as apples.

Now, there is a proper use for that product in the making of jellies, jams, and preserves from fruits which are normally deficient in pectin, but there is also an abuse of it which is more prevalent by far and which makes it possible under controlled manufacturing conditions where phosphoric acid is used to stretch the product with a minimum amount of fruit incorporated and an excessive amount of water, and yet have a finished article of normal consistency which can at present be labeled as a pure strawberry preserve. That is being done to-day. It is being done not because the industry does not recognize it to be contrary to the terms of the law, not because we do not know that it is being done contrary to the law, but because of our limitations in determining by such analytical methods as we have, which have not in their refinement been carried to the point where we can determine accurately the abuse which is taking place.

We are at this time powerless to prevent it. This results in an imposition upon the consumer and at the same time results in a trade-killing type of competition.

What we are seeking to do now is to develop methods by which the quantity of pectin present in a finished product can be determined. That is not the only question involved, since the quantity of pectin normal to various types of fruits varies with the different fruits. It is necessary to determine the amount of pectin that would normally be present from which we can conclude the amount of added pectin present on examination of a sample of the products.

We can not enforce the law until we work out those methods, and the working out of those methods requires research work of a high order, sometimes rather extensive and expensive. So, for the purpose of enforcing this law it is absolutely necessary that the bureau carry on not only its regulatory operations but that it shall maintain a corps of investigators who are studying just these problems and who are in a position to make it possible after the determination of the methods which will be applied in a laboratory for the field forces to maintain that control necessary to a proper enforcement of the law.

Mr. Anderson. Is the stretching of the quantity of jelly, or whatever it may be, creating an abuse that is very material?

Mr. Campbell. It is very material. In fact, I do not know anything that has produced demoralization in an industry to the extent that this practice has in the fruit-preserving industry.

I had occasion to make that statement to the association of fruit preservers itself a few weeks ago at their convention in Louisville, Ky. There are a great many food manufacturers, those who represent the best of the industry, who are opposed to this abuse, and they are seeking to produce a proper and honest product, sell it honestly, and to gain for themselves only a normal profit, but they are meeting competition on the part of others who are not controlled by such impulses who are able to put out an article at one-half the cost of the genuine product and sell it in competition with the genuine article.

Now, that illustrates the extent to which efficient enforcement of this law is not only a measure of protection to the consumer, but it indicates the special protection that in its normal operations is accorded to the farmer. The market for the farmer in a great measure is the sale of his fruits or his products to manufacturers of this kind, and if the market is destroyed as the result of this practice it directly affects the farmer.

The matter of import control is another question which gives us trouble. I am merely touching on one or two characteristic illustrations, that you may know with what we must contend.

NEED OF ADDITIONAL INSPECTORS.

We have been required because of the costs incident to operation generally in the last several years to permit in a great many instances vacancies to exist when they occur rather than to make any effort at all to fill them. This has resulted in a depletion of the force in certain branches that has been very serious.

We have recognized the difficulty of attempting adequately to control the importations as they occur in the principal laboratory-port sections of the country, like New York, Philadelphia, Boston, San Francisco, Seattle, and other points. In a great many of these places, more particularly in New York where the bulk of the imports are brought in, the warehousing conditions are extremely bad.

That center is congested, heavy demurrage charges are imposed incident to delays, and with a depleted force that is not capable of taking care of the situation as it may occur in its fluctuations from time to time, we are confronted with one of two courses: The first is to require the importer to hold his goods until we can make an examination and permit the demurrage in such instances to eat up his profits: the other is to exercise the discretion which we have in the determination of just what we shall select for examination and let the other go by without prejudice. We have adopted the latter course, trying to select only those goods which we have reason from our experience and knowledge of the history of the product to suspect as violative of the law.

Mr. ANDERSON. Just why are you not able to fill the vacancies?

Mr. CAMPBELL. We have not the money.

Mr. ANDERSON. This is a lump-sum appropriation?

Mr. CAMPBELL. Yes.

Mr. ANDERSON. And you do not have any vacancies in the statutory sense?

Mr. CAMPBELL. No; we must have a general reduction, of course, of the entire force if we allow for operating expenses the funds that ought to be allotted for operations to meet the expense required at the present time.

Let me tell you of the character of the organization that we have. The organization is changed from that which originally existed. As I have indicated, there is now a modified condition in food and drug manufacturing conditions. At the present time we can not employ effectively the methods that prevailed when we first started in to enforce this law. It is necessary to develop methods that will permit of a more comprehensive review of the food manufacturing practices of the country as they apply to any particular product. If you make an exhaustive survey, as I have indicated in connection with preserves, you must direct the operations generally throughout the country on a uniform basis. That is more expensive than the practice which prevailed formerly, where an inspector could go out, select a sample without very much knowledge—probably because he had no knowledge in regard to it—turn it in to the laboratory and take the chance of that being an adulterated product.

It is desirable to increase the force of inspectors, but if we do that we must reduce the number of chemists, and if we reduce the number of chemists we can not maintain satisfactory interstate control and particularly satisfactory import control in congested-laboratory port cities.

This fact is pretty well appreciated by the industry, and I think the importers themselves have in a most kindly spirit considered the condition and have cooperated with the bureau as far as it was possible to do so. I may say here that last wear a committee of importers in New York, in recognition of the fact that we needed more chemists there, came to Washington and to the Bureau of Chemistry and announced that the purpose of their presence in Washington was to appeal to the Appropriation Committees in both the House and Senate for an appropriation of $75,000 to apply exclusively to New York.

I told them then that the Secretary of Agriculture had it within his power to assign immediately to New York enough chemists to handle that situation, but if that were done it would be at the sacrifice of work that ought to be done in San Francisco, Seattle, Boston, and other places, and that we did not feel that we could ask for any increase in the appropriation at that time in recognition of the general financial situation; that it was our purpose to enforce the law as best we could with the insufficient force we had and wait until a later date for an increased appropriation that would guarantee a more satisfactory condition of affairs with respect to both interstate and import control than was possible with the present organization and with the present limitation of funds.

Mr. **Anderson**. How many inspectors have you?

Mr. **Campbell**. We have less than 50 for the entire United States.

Mr. **Anderson**. That includes the inspectors of imports?

Mr. **Campbell**. Everything. Some States alone have as many as 20 for just State work.

I may say this, Mr. Chairman, that we have exhausted almost every resource at our command in the development of plans which would permit us to operate economically and make the least possible sacrifice of efficiency. We have developed a cooperative plan with State officials. We have tried to convince them that there was a common interest between the Federal Government and State governments in this control. The terms of the law make it possible for State agents or State officials to inaugurate prosecutions under the Federal law. In the bureau we have appointed a man to have charge of cooperation with the States, an official who was formerly a State chemist, and his business is to develop an interest on the part of State officials to take advantage of this cooperative arrangement and show them just how it can be done. We have had also good support from business organizations, trade associations, which recognize that it is to their benefit to guarantee the marketing of a product whose integrity is unquestioned. But I feel that I can say to you now that you will be requested in the future, probably immediate, probably distant, by the chief of the bureau, whoever he may be at that time, to make a material increase in this appropriation, because conditions that are developing and will continue to develop will require a greater force for the satisfactory and efficient enforcement of this law than the one we have now.

Mr. **Anderson**. What is the necessity for the travel outside of the United States, which seems to be an item here, for which $4,280 is provided?

Mr. **Campbell**. We do not need any travel outside of the United States. The history of that item is this: Some several years ago an item was put in the appropriation bill to make it possible for our port laboratories to make examinations of food products offered for export to foreign countries. A great many foreign countries will not accept as imports into those countries shipments from any source unless there is an attendant certificate from some Government authority as to the purity of the article. This item was put in to make it possible for us at the request of exporters to make such examinations. Last year, or the year before I believe, on the floor of the House an item was put in limiting the travel outside of the United States, whereas no travel outside of the United States was required or contemplated under that. That was apparently a guaranty that the item would not be abused, but there is no travel outside of the United States under it at all.

ENFORCEMENT OF LAWS RELATING TO THE IMPORTATION OF IMPURE TEAS.

Mr. ANDERSON. Take up the item on page 126, the item for the enforcement of the act to prevent the importation of impure and unwholesome tea.

Mr. CAMPBELL. This item was transferred from the Treasury Department two years ago, I believe, transferring the duty of the enforcement of the tea act, which controlled the importation of tea, to the Department of Agriculture. It transferred bodily the amount of money available then to the Treasury Department for the enforcement of that act. There is no increase being asked for on that at all.

INVESTIGATION OF NAVAL STORES.

Mr. ANDERSON. All right; take up the next item on page 127, the item for investigating the grading, weighing, handling, transportation, and uses of naval stores, the preparation of definite type samples thereof, and for the demonstration of improved methods or processes of preparing naval stores, in cooperation with individuals and companies, including the employment of necessary persons and means in the city of Washington and elsewhere.

Mr. CAMPBELL. This work has been done as a result of the need for attention to the practices which prevailed in naval stores traffic. One of the outstanding things that has been done by the laboratory which was engaged on this work is the development of stable types of rosin. The abuses which existed in the marketing of rosin, where there was no very definite arrangement made by which the grade of rosin, which was the regulating factor in its price, could be determined, was considered and met effectively by providing for these stable types. These types, which are glass, are the property of the bureau. They have been loaned under our control to various boards of trade and are used in appeal cases for the determination of the grade of rosin.

Mr. ANDERSON. Have grades been established for rosin that are accepted by the trade or that have a legal effect?

Mr. CAMPBELL. They have no legal effect. Trade custom altogether, expert trade judgment determines these grades.

The work that has been done on turpentine has been of a character which involved, first, a consideration of the methods of distillation, an exercise of proper precautions to guarantee maximum yield, and the preservation of the turpentine; and, second, a consideration of the character of trade practice with respect to traffic in turpentine.

Turpentine is adulterated with mineral oils. This is of wide practice, and we are now seeking to determine what the chemical constants are of turpentine that will make it possible to say in the same definite way that we have said of rosin what a pure turpentine will be. The laboratory is working in cooperation with the industry on this and is appealed to almost daily for the examination of lots of turpentine and for an expression of its opinion as to the results obtained from these analyses of turpentine.

Mr. Anderson. What is the relation of this work to naval stores work done by the Bureau of Forestry Laboratory?

Mr. Campbell. I do not know. Dr. Veitch, who has charge of the leather and paper laboratory, which is in charge of that work, may be able to tell you.

Dr. Veitch. We take it up just after they drop it. Their work is the woodwork and ours follows it onto the distillation and handling.

Mr. Anderson. They do not do that woodwork at Madison. That is a laboratory proposition, if anything.

Dr. Veitch. It is primarily a field study. They work out the methods in the forest, the cupping of the trees and the clarifying and the best methods of determining how to increase the yield without injuring the tree. They have done splendid work. We take it up there, take the material and study it through into manufactured products and the methods of handling them, and the material and other products made from them.

Mr. Anderson. All right.

ENFORCEMENT OF LAWS RELATING TO THE IMPORTATION OF IMPURE TEAS.

Mr. Magee. I would like to ask as to the item on page 126, going back to that, carrying into effect the provisions of the act to prevent the importation of impure and unwholesome tea, $38,000, how much is expended of that amount?

Mr. Campbell. $38,000. In 1922, $35,000 of that was expended.

Mr. Magee. You expended in 1921, $33,000?

Mr. Campbell. Yes.

Mr. Magee. And how much of the $38,000 has already been expended in the seven months of the fiscal year?

Mr. Campbell. I do not know how much has been expended up to this moment. You know the importation of tea fluctuates very decidedly, Mr. Magee. The law is compulsory in the matter of the examination of all importations.

Prior to the transfer of this organization to the Department of Agriculture it was necessary to maintain a force that would handle the peak of importations. There was some arrangement made then with the customs division which permitted the employment in whatever way was practical of those engaged on tea inspection work when they were not confronted with the peak situation. We are now articulating our work with their branch establishments wherever it is possible to do so. The chief tea examiner to-day with one of the men from the bureau is going over that matter to effect a better articulation between the general forces of the bureau and the tea inspection force to make it possible to use in the enforcement of the food and drug act these men who must be maintained for the tea inspection in the time of peak tea importation.

During the last three or four years the importation of tea was less than normal, and that is probably why not more than $35,000 was expended in 1922 and $33,000 in 1921 of the appropriation of $38,000.

Mr. MAGEE. Does the expenditure run along on a general average basis or are there certain seasons of the year when the expenditures are heavier than other seasons?

Mr. CAMPBELL. The importations of tea are heavier in certain seasons. That occurs biannually. I think it is in the spring and the fall that the importations are heaviest.

Mr. MAGEE. Will you file a statement with the committee of the amount you have expended so far in the seven months of this fiscal year?

Mr. CAMPBELL. There has been expended $16,541.43.

INVESTIGATION OF MANUFACTURE OF INSECTICIDES AND FUNGICIDES.

Mr. ANDERSON. Take up the next item on page 128, for the investigation and development of methods of manufacturing insecticides and fungicides, and for investigating chemical problems relating to the composition, action, and application of insecticides and fungicides.

Mr. CAMPBELL. The purpose of that work, Mr. Chairman, is to develop effective insecticides and fungicides that can be produced at less cost than the products which are now used can be produced. Some very interesting work has been done on it under this fund.

The bureau developed the method for the manufacture of calcium arsenate, which has been used by the Bureau of Entomology in its work on the cotton boll weevil in the South as a cheaper insecticide than lead arsenate.

Also during the period of the war copper was high and was needed for other purposes, and we began to study some plan whereby Bordeau mixture, of which copper is the effective base, could be manufactured with less quantities of copper and at the same time be as effective for the purposes required as the product theretofore had been. Work was done which made possible material reduction of the quantity of copper used. This, of course, is no longer an item, and I just cite it as a condition that existed at that time.

One of the most interesting pieces of work that is being done now is one that has possibilities that we do not want to make any forecasts about until a more accurate determination can be made of the real potency of the product.

Pyrethrum is, as you know, an insect powder. One of our chemists has studied the potent properties of pyrethrum and was able to isolate it. Then he began to study it with a view to building up synthetically a product that could be used as an effective insecticide. In the same way nicotine has been attacked and a chemical compound has been discovered which has a relationship to nicotine and which can be produced very much more cheaply than the nicotine for insecticidal and fungicidal use, and which is much more potent than nicotine.

The entire field of insecticide and fungicide, so far as their chemical character is concerned, is limited. The first thing you have to do is to find some product which, in the nature of the plant, is not going to be destructive of the plant itself. The ideal insecticide or fungicide would be one that would not at all affect the plant and at the same time would destroy the insects or the fungi, and yet would have no effect whatever on man at the time of consumption should some of the material sprayed on the plant adhere at the time of eating.

The work we have done under this appropriation has been to discover insecticides and fungicides which would be effective and could be produced and sold to the farmer at materially less cost than he is paying for insecticides and fungicides at the present time.

Mr. ANDERSON. You are apparently not spending this entire appropriation this year.

Mr. CAMPBELL. It is essential that the men put on that sort of work be good organic chemists, and we have not been able to get the men that we wanted; and rather than employ those we could get for the amount we could pay we have let the money revert to the Treasury, and we have done such work only as we thought the qualifications of the men available would justify us in undertaking.

Mr. ANDERSON. Do you expect to get those men during this year?

Mr. CAMPBELL. Yes; we think also that we have developed one of our own men who could be employed on this work advantageously.

COOPERATIVE STUDY OF METHODS OF DEHYDRATION OF MATERIALS USED FOR FOOD.

Mr. ANDERSON. We will take up the next item on page 129, the item for the study and improvement of methods of dehydrating materials used for food, in cooperation with such persons, associations, or corporations as may be found necessary, and to disseminate information as to the value and suitability of such products for food.

Mr. CAMPBELL. The work of the bureau on this was brought about through conditions created by the war. This is the first time—the present year—I think, when we have had an appropriation for this type of work out of the appropriation bill.

The first work was undertaken at the expense of the funds appropriated for stimulating agriculture.

Through the period of the war, when it became important to get foods, and to get them in such a way that the item of transportation would not be a prohibitive measure, there was a natural attempt at the preparation of dehydrated products.

The dehydration of foods is not a new thing, but it is probably the original way of preserving food products.

Through wars, and more particularly through the Boer War, a goodly portion of the food supply of the army—not a variety, but such as soup material and the like—was dehydrated products. Our effort was devoted to the development of the process or art of dehydration for the purpose of making available quantities of food with reduced bulk resulting in lessened expense for transportation, not only for the expeditionary forces, but for use at home where it was necessary to ship the home supplies abroad.

There are several features involved in the matter of dehydrating foods. We soon saw that there were a great many real scientific problems to be solved in establishing the art of dehydration; it was not simply a question of drying out food products, but drying them out under a definite control; the determination of the necessity for a blanch, the length of that blanch, or whether a blanch was required at all; later its evaporation under proper conditions of humidity and temperature, the period through which evaporation should be extended; all for the purpose of securing an article which would reproduce as nearly as possible the original food product.

As a result of the work done there has been developed on a commercial scale the industry of dehydration, but it is not national in its scope by any manner of means. It is really in the pioneer stage at this present moment. To what extent marketing conditions will permit further development, I do not know. We know that a market is absolutely necessary in the first place, but before a market can be created it is essential that there shall be a guaranty on the part of the industry itself that it can produce these products with some degree of stability. I think it would destroy the future of dehydrated commodities if the public were to become interested and suffer an unfortunate experience. Should you go to your grocery, have a good experience, be satisfied with the product, and then go back again and get another package, and find it to be entirely different, subject to restorative properties of an entirely different kind, your experience would be wholly unsatisfactory. So it seems to me the first thing the industry itself must do, or have done for it, is to find a solution of those scientific questions involved in the process of dehydration which will permit the restoration of those materials under standard condition.

Mr. **Anderson**. How far have you gotten in that direction?

Mr. **Campbell**. We have made very satisfactory progress on a great many materials. As far as fruits are concerned, of course, that is an established industry so far as the west coast goes.

We have taken it up with certain types of vegetables. There is no question whatever about the establishment of a method for the evaporation of certain kinds of vegetables, but with certain others we have not made sufficient progress and are studying those now.

It is our purpose to prepare immediately for the publication of a manual for the benefit of the industry or anybody who wants to undertake the work of dehydration of food products.

Mr. **Anderson**. How do you get this information to the trade now?

Mr. **Campbell**. The trade is restricted now and is in constant contact with us at this time, so that to the extent there are existing manufacturers of these products we get to them by correspondence or by visiting their place or by having them visit the bureau.

Mr. **Anderson**. The trade seems to think the bureau is not doing as much as it ought to do to help them. I do not know just what they want, but I expect what they want is to have the Government make a market for them.

Mr. **Campbell**. You are quite right.

Mr. **Anderson**. And I could never see any way that the Government could go into that phase of it.

Mr. **Campbell**. I sympathize with your view, Mr. Chairman.

Mr. **Anderson**. I have talked with some of these people and they express the view that the help they need is help in creating a market, and I think they are right about it, but I do not think it is a part of the function of Government to create a market for them.

Mr. **Campbell**. Certainly not the function of the Agricultural Department, I do not think. I intended to refer to that later on. Of course, we have been importuned to use such appropriation as we had more in the manner of creating a market than in the study of the scientific problems involved, but we have decided that our function was the determination of those technological questions and making the results of our work available to the public, no matter whether the industry is to be developed on a national scale now or next year, or in 10 years from now; we will then have solved our problem.

Mr. **Anderson**. Does the restoration of those products represent simply the addition of water?

Mr. **Campbell**. Yes.

Mr. **Anderson**. And nothing else?

Mr. **Campbell**. That is all.

Mr. **Anderson**. Are the processes by which these vegetables are dehydrated worked out on a factory scale?

Mr. **Campbell**. We have worked them out on a factory scale where we have worked in cooperation with the industry and given them advice and counsel, but we have no means of working them on a factory scale ourselves. We have a small demonstration laboratory, but can not operate it on factory scale processes.

Mr. **Anderson**. Are they able to manufacture a product now which is suitable in quality and certain of restoration of flavor?

Mr. **Campbell**. Certain classes of vegetables and fruits. I would not say that of every product. Both fruits and vegetables are now capable of satisfactory manufacture.

COST OF DEHYDRATED PRODUCT AS COMPARED WITH CANNED.

Mr. **Anderson**. How does the price at which dehydrated products will sell compare with the price at which canned commodities sell?

Mr. **Campbell**. We have not gone into that sufficiently to make a statement that would be at all satisfactory, Mr. Chairman. I do not believe—this is my personal view—that a dehydrated food products factory should be started unless the conditions are of a kind that will give, without undue expense, very great supplies needed for this work and unless it is under that type of management that appreciates fully the scientific features involved in the technology of the operation. I don't believe that dehydration as an enterprise is a thing that should be undertaken at all, for instance, by a group of farmers, or even by a group of business men who may have limited capital immediately for that purpose in a locality, without providing themselves thoroughly with knowledge and with sufficient capital to undertake it advantageously. Our information is—and we are dependent upon the industry in this respect—that most efforts that have been made have been required to be refinanced, and the refinancing of them has usually carried the capital of the organization to very much larger proportion than could be undertaken in a small way as with a cannery, for instance, in a restricted locality. Some of these have made a success of their work financially, they claim, because they have had as an adjunct something in the nature of a cannery. We can not say with any degree of certainty that the economic phases of dehydration are such at the present time, at least, that it would be an appealing proposition, but that is no reason why in time it will not be. I do not see why it should not eventually be. Indeed, it is in my judgment more a failure to appreciate that there is something more than merely drying involved in the dehydration of food products than inability to get funds for adequate financing, which is responsible for the limited development of the industry.

Drying merely by heat blasts or a strong current of air is not all that is involved. There are scientific problems which have been recognized and partially solved. We want to make known to the public the results of such work, because there seems to be sufficient reason to justify the conclusion that in time dehydration will be a national enterprise.

CREATING MARKET AND PACKING OF DEHYDRATED FOODSTUFFS.

One of the most difficult things existing now in the matter of creating a market is the restoration of the product itself in a uniform way. Another is preservation. Some firms who are in position to reproduce their product so it will possess suitable restorative properties are not in a position to preserve the article after manufacture. It is put on the market and you will find it like this [producing a bottled sample, exhibiting marked deterioration and the presence of mold].

So one of the things to which we are going to give attention is the question of packing or packaging. We are trying to get that work completed before we undertake the publication of the handbook to which I have referred.

Mr. **Anderson.** Does this material have to be preserved in air-tight containers?

Mr. **Campbell.** It should be.

Mr. **Anderson.** Its weight, I take it, is very much less in proportion to its bulk than that of canned goods generally?

Mr. **Campbell.** Oh, yes; very much less.

CANNING PROCESS CHEAPER.

Mr. **Anderson.** Do you think the work that is being done under this appropriation and the possibilities of developing something out of it justify the continuance of the appropriation?

Mr. **Campbell.** I do, Mr. Chairman, from this standpoint: I do not know that I would have said that if the work had not been inaugurated and carried to a certain point. That work is definitely under way, and progress of the kind I have indicated has been made. and I do believe that since the equipment exists and is in the hands of men who have had experience and training on this line of work that it would be a mistake to arrest further operations for the year or two years longer that I think would be necessary to preempt the field in so far as those technological problems are involved. After that has been done there will be a method that will be available to the public or to anyone who wants to undertake this enterprise immediately or eventually in the future.

Mr. **Buchanan.** Nearly all of these products are now preserved through canning process, are they not?

Mr. **Campbell.** Yes, sir.

Mr. Buchanan. And that is much cheaper than the dehydrating process?

Mr. Campbell. I dare say it is at the present time, Mr. Buchanan. I can not speak authoritatively of the economics of that.

Mr. Buchanan. It seems to me that you even have to cut it up into smaller pieces to dehydrate it than to can it, judging from these samples?

Mr. Campbell. Yes.

Mr. Buchanan. And the canning process preserves them perfectly, does it not?

Mr. Campbell. Yes.

Mr. Buchanan. And the dehydrating process would be more expensive?

Mr. Campbell. Possibly so at the present time with out present knowledge of the operation of plants. However, we do know that sweet corn, at least, can be dehydrated for about one-half the cost that it can be canned.

Mr. Buchanan. There is no reason why it should not always be more expensive, is there?

Mr. Campbell. You see, that will be offset by this fact—that after the product has been dehydrated the cost of transportation of the dehydrated product will not be at all comparable with the cost of transportation of canned goods, and the cost of storage will be much less.

Mr. Buchanan. Unless you were in war there would not be much necessity for the concentration of great masses in small spaces, and a further trouble is that every country has a canning process. I am just getting down to the practical phases of the utility of dehydrating products, in view of the fact we have such success in canning them.

Mr. Campbell. Yes; I know.

Mr. Anderson. I think possibly the only feature of it which would seem to me to present the possibility of economic saving at all is the transportation phase of it, and whether there would be enough saving in freight cost to make up for the probable additional cost of manufacture is an economic question that I suppose could be worked out.

Mr. Campbell. I think so.

Mr. Anderson. But evidently it has not yet been worked out.

Mr. Campbell. No.

Mr. Lee. Would not the question of packing figure largely in the comparative costs?

Mr. Campbell. The cost of tin, of course, is a factor that comes in, and also the availability of tin supply.

Mr. Lee. You could pack this in wood containers, could you not?

Mr. Campbell. Yes; that is altogether packed in containers not of metal.

Mr. Lee. In barrels?

Mr. Campbell. Yes.

Mr. Buchanan. What effect does moisture in the air have on this?

Mr. Campbell. It has a bad effect and will bring about deterioration if it is not in proper condition, but the thing they are doing largely so far as there is a market for this and so far as these commodities are put on the market at the present time is to put them in waxed containers or moisture-proof containers.

Mr. BUCHANAN. That would probably cost as much as tin.

Mr. CAMPBELL. I do not know; I could not speak on that. We have not gone into that question; but I do not think it would cost as much as tin.

Mr. ANDERSON. I think not, considering the size of the package.

Mr. CAMPBELL. No.

Mr. ANDERSON. I think it would cost less.

Mr. CAMPBELL. Our concern primarily is to continue the technological problems involved. We do not know whether the economics will justify dehydrating as a national enterprise. I could not say as to that, and I would not attempt to. But the work has been carried on with success and with the cooperation of the industry in so far as refers to the technological processes. We have worked them out so far that I think it would take one year possibly, and not more than two years at the most, to finish the work we have in mind, and for that reason I think it would be undesirable to discontinue an operation that has been carried thus far.

INVESTIGATION AND DEVELOPMENT OF METHODS FOR PREVENTION OF GRAIN DUST AND OTHER PLANT DUST EXPLOSIONS.

Mr. ANDERSON. We will take now the next item on page 130, the item for the investigation and development of methods for the prevention of grain dust, smut dust, and other plant dust explosions, and resulting fires, including fires in cotton gins and cotton oil mills. My recollection is that was put in in the Senate last year.

Mr. CAMPBELL. It was. It has never been in before. That was carried under the appropriation for stimulating agriculture, and when that fund was not available that work was taken over by the United States Grain Corporation. It took over bodily the organization for that work. The purpose of this is to study the causes of explosions of dust. Dust with the proper mixture of air is just as explosive as gas. Some of the most frightful explosions that have occurred in recent years have been those that have been the result of dust explosions. It is inflammable, and if you get the right mixture all that is needed is a torch of some sort to set it off.

Our purpose in this was to study more particularly the condition of the grain elevators. It may be a matter of interest to you to know this, that through the period when there was a force that was taken on by the bureau under stimulating agriculture originally and a continuation of that work by the United States Grain Corporation when the stimulating agriculture funds were no longer available, there was a rigid inspectional control maintained in all of the grain elevators in which the Government wheat supply was stored. There was a supply there varying from $100,000,000 to $500,000,000; that is, the value of the quantity of wheat that was stored throughout that period, and the report of the United States Grain Corporation indicates that the insurance on that alone would have been in the neighborhood of one and one-half million dollars. They did not take out insurance, but they maintained this control, and the total loss that they suffered was $25,000. Now that might have been coincidental or it may have been the result of that inspectional control, and I am inclined to think that it was.

This work has also been done in connection with threshers, and there it has a direct relationship to the farmer. The explosions due to dust and smut in the threshing operations in the Northwest were so frequent and so expensive that they were unable to get any insurance at all, and as a result of our work in putting on dust removers, the insurance has been restored and the explosions reduced to decidedly below normal.

The work also extended to cotton gins in the South, more particularly in Texas. There were frequent fires in connection with those cotton gins which we concluded were due to static electricity, and by the observation of those conditions and an arrangement for grounding, those fires were very materially reduced. Again it may be coincidental, but we had no fire in any one of them where we had effected this grounding arrangement.

Mr. ANDERSON. You are through with this threshing machine?

Mr. CAMPBELL. Yes. I should like to have Mr. Price, who has charge of that, to make a statement in connection with it.

Mr. PRICE. That phase of the project has been finished. The area covered has been between the Cascades and the Rockies. In that section in 1914 as many as three hundred explosions occurred in six weeks' time during the threshing of the wheat crop. The preventive devices designed by engineers of the department and utilized in the Palouse region of the State of Washington have proved effective. However, during the last two years similar explosions occurred in the Walla Walla section of Washington State, a region in which practically no educational or experimental work had been conducted. The other phase is the cotton-gin fires and the explosions that are occurring during the handling and milling of grain in the grain elevators and mills. That is a part of the work of the bureau that will take up these funds. We feel the threshing work is a matter of extension and not of further research.

Mr. BUCHANAN. Do you think any fires are caused from explosions of dust in cotton gins?

Mr. PRICE. There are no explosions of dust in cotton gins; they are fires. In Texas during 1916, 1917, and 1918 about 600 fires occurred in cotton gins. The fires were caused by the ignition of the cotton by static electricity.

The cause of the explosions in the threshing machines and of the fires in the cotton gins was supposed to be identical, which proved to be the case. The rapid movement of the cotton through the galvanized iron pipes from the wagon to the gin created sufficient static electricity to ignite the cotton. Grounding methods similar to those for carrying away the current from the threshing machines were recommended by the bureau and proved effective.

Mr. BUCHANAN. You think the fan which sucks the cotton out of the wagon through a galvanized iron pipe into the gin, that the passage of that cotton sucked by that draft through there, is sufficient to develop electricity enough to ignite the cotton?

Mr. PRICE. Yes, sir. I might clear that up. The condition around Dallas and Fort Worth was somewhat similar to the climatic conditions as they were at Spokane. The humidity was very low and the temperature extremely high. The electrometers used in that work both in Texas and the Pacific Northwest have recorded voltages which have ranged from 5,000 to 50,000 volts. There is practically no amperage in the current, but the spark is hot enough to ignite the cotton.

There was some question about that in Texas at the time and to prove the theory we cooperated with the Bureau of Standards and installed a similar equipment out there and were able to ignite the cotton by the sparks produced by the friction of the cotton in the pipes.

Mr. Buchanan. The friction of the cotton on the pipe?

Mr. Price. The galvanized pipe. There were over 600 fires around Fort Worth and Dallas.

Mr. Magee. Do you think the appropriation is justified?

Mr. Price. The most recent explosion of this kind occurred at the Northwestern elevator in Chicago, an elevator of 10,000,000 bushels capacity, in which all the men were killed. We have had 75 lives lost in the last five large explosions; the property damage has been over $7,000,000.

In one case in Cedar Rapids in an explosion of corn-starch dust 43 lives were lost. We have had explosions of sugar dust, flour dust, and feed dust. These explosions occur in any industry where dust is produced in the handling of food products.

We find the dust mixed with air is just like gas. Explosions are occurring in industries where we have never heard of them before. Increased production and the larger quantities of fine dust being handled has increased the hazard.

We find explosions caused by electric sparks produced in the breaking of an electric-lamp bulb or by static electricity have caused considerable loss of life, and the bureau is trying to develop methods that will effectively prevent them. These methods are being applied as quickly as they are worked out.

Mr. Buchanan. Upon the basis of your theory the fire is due to the development of static electricity in the cotton gin from suction of a fan—what is your theory to prevent the fire?

Mr. Price. It has proven very effective to ground the cotton-gin pipes and carrying the current away to the ground from the gin. This was the first method tried out. The insurance companies have recognized the success of that to the extent of deducting 25 cents a hundred for insurance.

Mr. Buchanan. You mean the extension of a metal pipe or any metallic line to the ground?

Mr. Price. It is really a wiring method, attaching wires to the galvanized pipe and other parts of the gin to carry the current away as fast as the static electricity is formed.

Mr. Buchanan. That makes a better conductor, to carry it to the ground?

Mr. Price. Carry it right to the ground.

Mr. Buchanan. That is sort of on the theory of the old lightning-rod business?

Mr. Price. Exactly.

Mr. Magee. How much of this appropriation has been expended to date?

Mr. CAMPBELL. Up to date I do not know just how much we have expended, Mr. Magee.

Mr. MAGEE. What is your notion about it? What have you to say as to the practical results from this appropriation, as I understand this being the first appropriation for this purpose?

Mr. CAMPBELL. Yes; but it is not the first work done. It so happened this was the first appropriation that was carried in the Agricultural appropriation bill. The work was carried on in the same way under the stimulating of agriculture bill before this; that is when it was first taken up. When the stimulating agriculture bill was not available and that appropriation had died the United States Grain Corporation, because of the department dropping this work and the men, took over these men in a body and kept the organization intact for handling the work in so far as it applied to their grain elevators, and it so happened that after the very frightful explosion that occurred in Cedar Rapids, which was in a starch factory, and one or two other explosions that took place at that time, the Senate last year, apparently upon the demand of the industries for further studies of the conditions that were responsible for these explosions, inserted this item in the appropriation bill of last year.

I can say personally, Mr. Chairman, that there is no question in my mind about the justifiable character of this appropriation, aside from its humanitarian considerations, such as the loss of life. I think it is one of the cheapest investments the Government has ever made through an appropriation by Congress because of the prevention of loss of property the total value of which we can only conjecture.

Mr. MAGEE. When did the Cedar Rapids explosion occur?

Mr. CAMPBELL. What was the date of that, Mr. Price, do you remember?

Mr. PRICE. May, 1919.

Mr. MAGEE. And you have been carrying on this work how long?

Mr. CAMPBELL. We have been carrying on this work only one year.

Mr. MAGEE. But you speak about it being carried on under other legislation?

Mr. CAMPBELL. Yes; under the stimulating agriculture bill we had it one year, I think, before; it was then taken over by the United States Grain Corporation.

Mr. MAGEE. When did you begin to give attention to this work?

Mr. CAMPBELL. The stimulating agriculture bill was for the fiscal year of 1918. We carried it on through that year, and that was available no longer than the one year. Through that period we were giving attention to cotton gins in the South and thrashing outfits in the Northwest, and to grain elevators. Then when that appropriation was not available the United States Grain Corporation took it over and they gave attention exclusively to grain elevators.

Mr. MAGEE. How much appropriation was made in the stimulating agriculture bill, as you call it?

Mr. CAMPBELL. The stimulating agriculture bill was in a lump sum, and the allotment given from the appropriation to the Bureau of Chemistry for the support of this work was $50,000. It was more than this is.

Mr. Magee. I would be interested in knowing what the practical results of your work have been, if you have anything to say on`that proposition.

Mr. Campbell. Well really, Mr. Magee, it is very difficult to precisely indicate what the results have been because they are preventive and not of a kind that are directly tangible. We can only say this, that while losses have been so high—for instance, in grain elevators where this inspectional control had not been maintained—that the insurance was at a point which the grain corporation estimates would have been a million and a half to two million dollars to them if they had taken out insurance, they forewent that insurance and applied this system and their losses were only $25,000.

Now, the explosions in the thrashing outfits in the Northwest were so great that the insurance companies absolutely withdrew from that field and would not accept them as a risk at all. The work that we have done has made possible the return of that insurance at a very greatly reduced rate.

We have worked out methods that have reduced the number of these explosions to nothing, comparatively, where the application of these devices that have been indicated by us are made and, as Mr. Price a moment ago said, that work is now in the nature of persuading the thrashing outfits to adopt the methods we have suggested.

Likewise, in the fires in cotton gins, that was a matter of indicating the method by which insurance rates were very materially reduced. We can indicate those as definite results that have been obtained that have greatly improved conditions.

The employment of appliances that we have recommended to prevent dust explosions has in itself prevented disasters and prevented the loss of life and loss of property, the amount of which we can not say. That can only be conjectural.

UTILIZING WOOL-SCOURING WASTE.

Mr. Magee. Take the item on page 131.

Mr. Campbell. For the investigation and development of methods of utilizing wool-scouring waste.

I may say, Mr. Chairman, we are not asking for a continuation of this item further than for the one year.

Mr. Magee. This goes out?

Mr. Campbell. We are asking for it for this year but not for next year. This work was undertaken during the period of the war when we were unable to get in this country lanalin, which is the product obtained from wool grease, and which is used as the basis for medicinal ointments and the like. We relied exclusively upon importations of that product for our supply. It was found out that this wool-scouring waste, the liquor that came off after washing the wool, contained quantities of potash, the recovery of which was desirable if it could be undertaken. So the work we have done on this has been to convert a product which was a sewage—as a matter of fact its disposition was a question of expense, because it had therefore served to pollute streams and had been the basis of innumerable suits, litigation of all kinds, to some useful purpose by getting a supply of lanalin sufficient for our own use and at the same time to recover the potash that was in there.

We have carried this work now to a point where the only thing we expect to do is to consider its economic practicability. There has been an actual operating plant in Baltimore for the recovery of potash. The question, however, is just this: If the potash is present in quantities so small that its recovery would involve expense that would be greater than the value of that potash, then it is not a thing to undertake in an economic fashion.

There are in the washing of the wool various pans into which the waste water goes and the experiments now under way and which are intended to be finished within the coming year are to so control that that it will bring about the greatest saving in the vats of that portion of the waste which contains the potash in the greatest amount and to make the recovery of that potash an economic proposition.

Mr. **Magee.** Why did you say you are not asking any additional appropiration for 1923?

Mr. **Campbell.** We think our work then will be finished.

Mr. **Magee.** You may finish it by the end of this fiscal year?

Mr. **Campbell.** We do not think we can. If we could we would. That is right, is it not, Mr. Veitch?

Mr. **Veitch.** We can not possibly finish it this year, Mr. Chairman, but I am very hopeful we will in the coming year.

Mr. **Campbell.** At any rate this is the last time we intend to ask for an appropriation for this item.

Mr. **Magee.** You will not be back next year for an additional appropriation?

Mr. **Campbell.** No, sir.

Mr. **Magee.** Perhaps you can get along with less for 1923.

Mr. **Campbell.** Let me say this, because this I think is the conclusion of our statement, and say it with a spirit of being helpful to the committee, because I take it you wish us to come and give you these facts, and approach this hearing in the spirit of wishing to make for economy.

Mr. **Magee.** We want you to cooperate with us on the basis of facts and reasonable needs.

Mr. **Campbell.** That is just what we wish to do. I will say then to you that we have undertaken to effect a businesslike administration in our operations. We have been conscious throughout of the need of retrenchment and we have approached our work with a spirit based upon that recognition.

There comes a time, however, in projects of work where, after you have exhausted all of your administrative resources in effecting those economies, it no longer becomes economical to continue that work. You can approach the irreducible minimum. It is our opinion that we have just about reached bedrock in the Bureau of Chemistry. Frankly and honestly I do not know what we could do or how we could do it, or where we could turn to get the results either in regulatory or investigational work and effect further economies than we have brought about. I must say to you on the theory with which I introduced this statement that if because of the exigencies of the times you find it necessary to effect reductions in the estimates of the Bureau of Chemistry it is my honest judgment that it would be better to do so by the elimination of some one of these items in its entirety rather than to reduce them or any one of them by a horizontal cut, because I believe such reduction will make the longer operation of that project uneconomical.

Mr. MAGEE. I am going to ask you, if you will, to file with the committee a statement of the appropriation in each instance that has been expended to date.

Mr. CAMPBELL. I will be very glad to do it.

Mr. MAGEE. I think the members of the committee would be glad to have that information.

Dr. BALL. That would have to be with the idea that a great many items in agriculture are not continuous to the same extent.

Mr. MAGEE. It might be your expenditures would be greater in some parts of the year than in another part.

Dr. BALL. Yes.

Mr. MAGEE. And you might make that statement. I do not know how it is with my colleagues, but I think I could form a better judgment if I had before me the amount wou have actually expended, say, for the seven months of this fiscal year.

Dr. BALL. With the explanations as to the difference in the work.

Mr. CAMPBELL. We will be very glad to do it.

Dr. BALL. For example, working on thrashing machines can only be done when thrashing machines are running.

Mr. CAMPBELL. Seasonal questions, of course.

Mr. MAGEE. I think we understand what you have in mind. Have you any questions, Mr. Buchanan or Mr. Lea?

Mr. BUCHANAN. No, sir.

Mr. MAGEE. Well, this closes your part of the work.

(The statement of expenditures requested follows:)

Statement of expenditures of Bureau of Chemistry as of Jan. 31, 1922, fiscal year 1922.

Agricultural investigations	$41,421.31
Collaboration with other departments	[1]6,756.23
Color investigations	28,700.86
Table and sweet sirup, sweet-potato investigations	9,573.20
Naval stores investigations	[1]4,464.19
Insecticides and fungicides investigations	[1]9,357.58
Drying of vegetables, fruits, etc	[1]9,719.26
Plant-dust explosions and fires investigations	11,268.47
Wool-scouring wastes investigations	[1]3,318.05
Enforcement of tea importation act	[1]16,541.43
Enforcement of food and drugs act	388,274.43

SATURDAY, FEBRUARY 4, 1922.

BUREAU OF SOILS.

STATEMENTS OF DR. MILTON WHITNEY, CHIEF OF THE BUREAU OF SOILS; DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK OF THE DEPARTMENT OF AGRICULTURE; DR. C. F. MARBUT AND DR. R. O. E. DAVIS, SCIENTISTS OF THE BUREAU OF SOILS.

Mr. MAGEE. Dr. Whitney, is there any statement you wish to make about the Bureau of Soils?

Dr. WHITNEY. What do you want?

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[1] Pro rata expenses larger for second half of year than for first half.

Mr. Magee. Any statement which you think you would like to make to the committee on the subject of soils we would be glad to hear, and then we will take up the different subjects in detail.

COLLOIDAL MATTER OF SOILS.

Dr. Whitney. The work of the Bureau of Soils has progressed in a very satisfactory way during the past year and during the present year.

The work of the bureau was not interrupted as much during the war as that of some of the other bureaus. It was not very much enlarged, and there has been no particular curtailment since then.

I was very much gratified to find that during the war period one of the activities of the States that was maintained was the cooperation in the soil survey; with all of the stress they laid on production they did not materially withdraw their cooperative efforts in the soil survey, as they realized that it was a fundamental work that was as useful to them then as it is in peace times. Cooperation in the soil-survey work has continued to increase and is going on in a very satisfactory way at the present time.

The investigational work of the bureau is reaching a point where we are rounding out a modern concept of the nature of the soil. We have been working on this problem for a good many years, and the entire world has been working on it. We have made some very important advances during the past year and during the present year in our knowledge of the colloidal matter of soils.

Mr. Magee. On the what?

Dr. Whitney. On the colloidal material in soils, that has rounded out and perfected our knowledge of the constitution of soils far beyond anything that we have ever expected to accomplish. That is a distinctive achievement that has been accomplished during the past and present year.

I have with me a number of samples of soil types that I though the committee would be interested in seeing. We have been talking about soil types and soil survey, and I thought you would be interested in this collection, which is a small educational collection that we got together several years ago for schools, for high schools, for colleges, and agricultural colleges. This collection gives an impression of soil types that few of us have without concrete examples.

There are two jars for each soil type, one containing the soil and the other the subsoil, and you can tell by inspection the difference in the color, the difference in the character of the material, but always remember that you have to consider the soil and the subsoil rather than the difference in each one.

Mr. Magee. Which is subsoil?

Dr. Whitney. Well, the soil always is on this side and the subsoil on the other.

Mr. Magee. The soil is on the left?

Dr. Whitney. Yes; on the left.

Now, these soil types to us have an individuality. They differ just as cattle do in your herds, just as the animals do on your farms. You recognize a Holstein cow because it has certain markings and certain peculiarities of form, shape, and actions. Now, to us the color, the texture, and the profile of these soils have just the same meaning. They show that the different soil types differ in their internal activities; they have breathing, they have oxidation, they have digestive activities, and their capacity to produce crops, their need of cultivation, and their need of fertilizers is an individual characteristic of the soil type. It is these soil types we are mapping.

Mr. BUCHANAN. These do not have any meaning to me; they may to you, gentlemen.

Dr. WHITNEY. That is exactly what we are trying to impress upon the users of the soil.

Mr. MAGEE. I suppose you determine, as I understand it, the ingredients of the soil in different parts of the United States?

Dr. WHITNEY. Yes; their constitution.

Mr. BUCHANAN. And their lack of ingredients?

Mr. MAGEE. And their lack of ingredients?

Dr. WHITNEY. Yes; but it is a much more technical thing than we have heretofore realized, because it is not only a question of how much potash and how much phosphoric acid is present; it is a question of how these soils function.

Mr. MAGEE. You talk about how they function. I may have an erroneous idea about this proposition. I supposed one of the fundamental things you determine is what a soil will produce?

Dr. WHITNEY. What it will produce.

Mr. MAGEE. Or if it will not produce a certain commodity you see what that is due to?

Dr. WHITNEY. What it is due to.

Mr. MAGEE. What should be supplied to the soil in order to make it productive?

Dr. WHITNEY. Yes.

Mr. MAGEE. Is that right?

Dr. WHITNEY. Yes; and if it will not produce the crops you think it should produce, what other crop it is adapted to produce.

Mr. MAGEE. Exactly.

Dr. WHITNEY. What other use can you make of it? That is the object. Now, incidentally, of course, this work is being used by the States as a basis for their experimental work with plants and with animals. It is a soil basis for the investigational work with crops or with animals. It is also being used by them to a very considerable extent in their land classification as a basis for taxation. Several of the States are using this as a basis for equitable taxation.

Mr. MAGEE. What do you mean by that?

Mr. BUCHANAN. For the purpose of valuation.

Dr. WHITNEY. For the purpose of valuation. It has also been having the effect of stabilizing land values. In many of the States, in many of the counties that we have surveyed, the real estate agents have these maps up on their walls, and in a great many cases, in a great many localities, people will not buy land until its location is pointed out on the soil map.

Mr. BUCHANAN. Doctor, does not the Geological Department make soil surveys?

Dr. WHITNEY. No, sir.

Mr. BUCHANAN. Nothing but topographic and geographic surveys?

Dr. WHITNEY. And geological maps; that is, underground and mineral deposits. They do not touch the soil.

SOIL SURVEYS AND MAPS.

Mr. **Buchanan.** How long has your department been making soil surveys?

Dr. **Whitney.** Since 1899.

Mr. **Buchanan.** Have you made them in every State of the Union?

Dr. **Whitney.** Yes, sir.

Mr. **Buchanan.** How much more work have you to do in order to survey a few counties in each section of the country?

Dr. **Whitney.** Well, we have already surveyed a few counties in each section; a good many counties in each section. We have finished something over one-third of the United States.

Mr. **Buchanan.** One-third of the United States. Now, you mean of the agricultural sections of the United States?

Dr. **Whitney.** No; one-third of the United States.

Mr. **Buchanan.** Are you proposing to survey other than agricultural sections?

Dr. **Whitney.** Of course, there is a good deal we will not survey, a good deal of mountain area—I do not know how much—and there is a good deal of nonagricultural land in the West which will not be used for intensive agriculture, at least, unless other methods are devised.

Mr. **Buchanan.** I understand you, then, if you subtract from the work remaining to be done the mountain area not suitable for agriculture and other land that is not within your province, will you say you are half through the work?

Dr. **Whitney.** I should think that, possibly. I should think it would be very close to that.

Mr. **Buchanan.** Then when completed you will have surveyed every agricultural county in the United States?

Dr. **Whitney.** Yes.

Mr. **Buchanan.** And furnished that county and the State authorities and others who desire them with a map of the soil survey of that county?

Dr. **Whitney.** Of the soil survey of that county, and that is information that is unchangeable, and that will last for many, many years.

Mr. **Buchanan.** The map shows the character of the soil; and does that survey indicate what fertilizer is essential to raise the character of crop that is raised in that community?

Dr. **Whitney.** No; because that is largely dependent on the way it is treated.

Mr. **Buchanan.** The way it is what?

Dr. **Whitney.** The way it is treated; the way it has been farmed; the care that has been taken of it.

Mr. **Lee.** Would not that be a question for the Bureau of Soils?

Mr. **Buchanan.** This is the Bureau of Soils.

Dr. **Whitney.** You mean the Bureau of Plant Industry?

Mr. **Lee.** Yes.

Mr. **Buchanan.** Not necessarily.

Dr. **Whitney.** Well, they are making experiments with fertilizers on soil, but the point I was making was that you can not put on a map a system of treatment for the soil that will last indefinitely, because if you base it on the present conditions those conditions are going to change by occupation and treatment.

Mr. BUCHANAN. That is true, but the possessor of that map ought to have sense enough to know that when you publish a map you say present condition, soil deficient in nitrogen, or whatever it is, essential to raise cotton, essential to raise corn, or essential to raise the character of crop that is raised in that community. Then the owner of that land would know at that date that his land was deficient in that character of fertilizer or that element that is necessary to grow the crop grown in that country or usual to be grown in that country. He would know it is deficient on that date and will be for several years, because those things do not change in a twinkle of the eye.

Dr. BALL. This is a map forever.

Mr. BUCHANAN. But that would not impair the value of the map to put it on at the time it mas made that that was a fact.

Dr. WHITNEY. But suppose we come to an area that is poorly developed, as we do. We come to areas that are poorly developed. Why, my dear sir, in Texas——

Mr. BUCHANAN (interposing). What do you mean by poorly developed?

Dr. WHITNEY. We are mapping counties in Texas in our reconnaissance service that have less than 50 people in them. That is not a highly developed state of agriculture.

Mr. BUCHANAN. No; still you know the ingredients of that soil.

Dr. WHITNEY. Yes; but when we come to a county that has 500 or 5,000 farmers actively at work, and who have been at work for many years on that same soil, the conditions and the requirements of those soils that have been highly cultivated are different from the conditions and requirements of the other soils.

Mr. BUCHANAN. Certainly they are.

Dr. WHITNEY. Well, those things change; they change with the occupation of the land.

Mr. BUCHANAN. Just tell me the main features of what your map shows.

Dr. WHITNEY. It shows what the soil is.

Mr. BUCHANAN. What do you mean; what it is? We all know it is soil.

Dr. WHITNEY. It shows the type of the soil; the character of the soil.

Mr. BUCHANAN. Do you mean the name of the soil?

Dr. WHITNEY. No; the character.

Mr. BUCHANAN. It is sandy?

Dr. WHITNEY. Yes; sandy.

Mr. BUCHANAN. It is loam?

Dr. WHITNEY. Yes.

Mr. BUCHANAN. Does it show the ingredients of the soil?

Dr. WHITNEY. It shows its texture; it describes its profile.

Mr. BUCHANAN. You mean its topography?

Dr. WHITNEY. No; the profile from the surface down for 3 feet or 6 feet.

Mr. BUCHANAN. In other words, a sandy soil on top and a clay subsoil?

Dr. WHITNEY. A clap subsoil and a gravel area.

Mr. BUCHANAN. Or a gravel top and a clay subsoil or a gravel subsoil, as the character might be?

Dr. **Whitney**. Yes.

Mr. **Buchanan**. Or black waxy land?

Dr. **Whitney**. Yes.

Mr. **Buchanan**. We all know that by looking at it.

Dr. **Whitney**. Those characteristics change.

Mr. **Buchanan**. I want to know what your map shows that is beneficial to the farmer, the man who is to occupy the land, and whether your map serves a real purpose or not in the agriculture of the Nation, or whether it is more for information of people living in another section and desiring to purchase in that section?

Dr. **Whitney**. Well, it is for both purposes.

Mr. **Buchanan**. What service is it to the farmer?

Dr. **Whitney**. To the farmer himself?

Mr. **Buchanan**. Yes.

Dr. **Whitney**. It shows him a character of land that in other sections has been developed far beyond what he has developed his.

Mr. **Magee**. Now, right there, Doctor—I am speaking somewhat from experience in my own district in New York. A soil survey was made there——

Dr. **Whitney** (interposing). At what place?

Mr. **Magee**. Cortland County. Now, is not the thing that is more important than a map the detailed report of the investigation of the soil which you have provided for the distribution of to the farmers?

Dr. **Whitney**. They are equally important.

Mr. **Magee**. It seems to me nearly every farmer in that county wanted a report of this soil investigation.

Dr. **Whitney**. Yes.

Dr. **Ball**. That is the purpose of the map.

Mr. **Magee**. I think I had to go to the department several times to get a supply to meet the demands, and there were a great many inquiries, even before the investigation was completed, asking when will it be completed.

Dr. **Whitney**. Yes.

Dr. **Ball**. No question about the fact the farmer appreciates the soil map.

Mr. **Magee**. What I had in mind was the report.

Dr. **Ball**. Yes; and the report.

Mr. **Buchanan**. I do not know as they appreciate it more in my country than the map of the county with the roads marked out on it.

Dr. **Whitney**. That is in Texas?

Mr. **Buchanan**. Yes. I thought the maps were made by the Geological Department, and I have about 20,000 maps in my house right now, and I put an advertisement in the paper that I had these soil survey maps and would be glad to give them to anybody who wanted them. I did not want to send them broadcast and have them thrown in the wastebasket?

Dr. **Ball**. What county is that?

Mr. **Buchanan**. Washington County, Tex. I had an idea it was the Geological Survey.

Dr. **Whitney**. Perhaps it is.

Dr. **Ball**. Just a map, is it?

Dr. **Marbut**. The Washington County, Tex., survey was one of the first surveys we made, some 15 years ago, and up to that time we had not learned as much about making soil surveys as we know now.

We were concerned for a number of years with preliminary work, with learning it and the county to be surveyed. We had no example to follow. No such work had been done anywhere before.

Dr. WHITNEY. It seems to me there must be a misunderstanding, because originally there were only 2,000 copies of that map printed for the Congressman in whose district it was, and they have probably been long since exhausted. In addition to that the department gets 1,000 copies.

Mr. BUCHANAN. It may have been this was a topographical map of the Geological Survey.

Dr. WHITNEY. I am quite sure it is.

Mr. BUCHANAN. But they do not appreciate them, and those maps are lying there serving no real purpose.

Mr. LEE. I find, Congressman, that the investor going into one of these States likes to see the soil map.

Mr. BUCHANAN. I know he likes to see it, but that doesn't justify the expense.

Mr. LEE. He thinks it is a guide to the character of land he wants to purchase.

Mr. BUCHANAN. I got a request the other day from the county engineer, building a road across the county. I sent him a copy of the map. It will probably make a good guide for him. But what I want to see is the actual benefit of the soil map to the actual farmer—the practical benefit. I am afraid we have too much theory and not enough practice in some branches of the Agricultural Department, and I want to see the work carried out practically where the benefits will go directly to the farmer.

Dr. WHITNEY. Well, that is just one of the things I am trying to impress upon the committee, that there are facts that we have determined that we publish that we put no theory in; we leave that out. We describe what we see and leave it.

Now, the experiment stations take that map and use it as a basis for experiments and for giving advice to farmers. They try all kinds of experiments with crops, with fertilizers, with systems of rotation.

Mr. BUCHANAN. Let me tell you what I mean, so you will understand me. My district is intensively a cotton district and corn district. I mean the main crops are cotton and corn. You go there and survey my county, and you find several different characters of soil in there, and you find that in some sections of the county the addition of one character of fertilizer would materially benefit the cotton production there; in another section you find another character of fertilizer would materially benefit the corn production. That county is an old county and has been cultivated a long time; and if your maps carried with them that this soil is deficient in a certain element which, if added, would benefit cotton production or benefit corn production——

Dr. WHITNEY (interposing). That is the work of the experimental station.

Mr. BUCHANAN. I do not care if it is the work of the experiment station, we will make an appropriation here for the Federal Government to make these soil surveys within a county or within a State. It gets the nature of the soil, the elements of the soil, and it says where the soil is defective, and just a little more trouble would make that map wonderfully valuable to the farmer.

Dr. **Ball.** That is impossible. Dr. Marbut will explain it.

Mr. **Buchanan.** All right; let him explain it.

Dr. **Marbut.** Please state your question again.

Mr. **Buchanan.** All right; I will give you an example. You go to my county and make a soil survey, and you not only find out the soil and subsoil, but with a little additional trouble you can find out the constituent agricultural elements in that soil. Finding that out, they also know when they make the survey the crops that are grown or ordinarily have been grown there for years and years. They would then know wherein that soil is deficient for the production of that character of crop that is being grown there and has been grown there for years. It would make that map of practical value to the actual and practical farmer if the fact was inserted there that the soil is deficient in certain elements that it is necessary for it to have to make a big production or good production of the character of agricultural products being grown there and that have been grown there.

Dr. **Marbut.** May I say, Mr. Buchanan, that in the first place you are getting onto a very debatable subject, on which even the doctors do not agree.

Mr. **Buchanan.** It is the province of your department, whether the doctors agree or not, to find out the correct thing.

Dr. **Marbut.** And we are doing it.

Mr. **Buchanan.** All right.

Dr. **Marbut.** I can tell you this: There is not a soil in your county that is not deficient in pretty nearly everything that it takes to make a good crop.

Mr. **Buchanan.** That may be.

Dr. **Marbut.** We know that. But let me say this, that it took a long time to find that out. Now, we make a soil survey in an area in six months. We usually survey two counties with one party in a year, one county in the northern part of the United States and one county in the southern part of the United States. That survey determines the character of the soil other than its chemical composition, because you can not look at a soil and tell what its chemical composition is. Now, the determination of its chemical composition, as I understand it, is what you have in mind?

Mr. **Buchanan.** Yes.

Dr. **Marbut.** The ascertainment of its chemical composition is a much longer and more tedious process, because that has to be carried on in the laboratory.

Mr. **Buchanan.** Where—in the Department of Agriculture?

Dr. **Marbut.** Of the Bureau of Soils.

Mr. **Buchanan.** Yes.

Dr. **Marbut.** And that has been done. Now, since Washington County was surveyed we have got far enough to know——

Mr. **Buchanan** (interposing). I was supposing you make that soil survey now.

Dr. **Marbut.** Yes.

Mr. **Buchanan.** I am not talking about this old survey of Washington County. I am talking about the maps you are making now.

Dr. MARBUT. Now, we know this——

Mr. BUCHANAN. I am talking about your present maps.

Dr. MARBUT. Let me make this statement: The wide differences in chemical composition of soil are not present in the same texture of soil, in the same type of soil, in the same area. For example, the Norfolk sandy loam, in your county—Washington County, I believe, is in the south central part of the State——

Mr. BUCHANAN. Yes.

Dr. MARBUT. Possibly the east south central?

Mr. BUCHANAN. Yes.

Dr. MARBUT. We now know that the Norfolk sandy loam in that section has a very small amount of potash, often ranging around two-tenths of 1 per cent. It may range a little more than that. Out in the western part of the State, on the other hand, the Amarillo soil, a sample of which you saw there in the can you examined, has about 2.5 per cent. Instead of two-tenths of 1 per cent, it has about 2.5 per cent of potash. The Amarillo soils will have about 5 per cent of lime, and in your county there is very little lime in the soil and none of it is in the form of limestone. It was not inserted in the report at the time Washington County was surveyed because we did not know it.

Now, it is a matter of fact, the policy of the department—Prof. Whitney can explain that—the policy of the department is not to insert those things in the report, but the chemical composition of the soil will be discussed in separate reports.

We have something like 150 analyses of soils now that have been accumulated in the last 10 years. Those chemical analyses do tell and we do know what the deficiencies of the soils are in different parts of the United States. Now, we do not know it all, but we are getting at it through chemical analysis.

Mr. BUCHANAN. I won't take up too much time, but here is why I mentioned it: You separated it and put one in the report and one on the map, and a man gets the map and doesn't get the report.

Dr. MARBUT. No; the map and the report both go together.

Mr. BUCHANAN. They go together?

Dr. BALL. Oh, yes.

Dr. MARBUT. They are bound together.

Mr. BUCHANAN. That is all right. But if that report shows, say, the loam soil of Washington County—Norfolk, or whatever you call it—has two-tenths of 1 per cent potash and how much it would be necessary to add to make a fertilizer for cotton——

Dr. MARBUT. If you will find some one who will commit himself on that statement, I will be glad to see him.

Mr. BUCHANAN. Then this branch of the Agricultural Department is a failure.

Dr. MARBUT. Not by any means.

Dr. BALL. We don't know everything that is to be known. We hope to know it in the future.

Mr. BUCHANAN. But if the Agricultural Department is serving its mission you do know if a soil is lacking in potash for raising corn, potatoes, or anything else, and you know that an addition of a certain amount of potash will help that by your experiments, or else your experiments are in vain.

Dr. **Ball.** Yes; those facts are given in the report, but the best agricultural practice for this individual soil will be a matter of experimentation for years and years and will change with the change in the fertility of the soil as a result of farming operations, and will change as a result of the diversification of crops, and in years to come will change with the change in character of commercial fertilizer as the development of that goes on, so the thing you would do at this time would not be the thing to do 10 years from now.

Mr. **Buchanan.** That may be, but you are not putting that down for 10 years.

Dr. **Ball.** Forever. What you put on your map must be a record that will stay there forever. If you put on that map a definite statement to the effect that you must use so much of this fertilizer or so much of that the maps would be worthless; that would be the thing to destroy them, because they would be misleading.

Mr. **Buchanan.** No; it would not.

Dr. **Ball.** What you want to put on those maps are the fundamental general things that will be true for ages to come and then leave it to the local men to give the investigational results in detail.

Mr. **Buchanan.** It may be thrown away and destroyed, but you can't tell me that the land changes so rapidly——

Dr. **Ball** (interposing). No; but the science of soil fertility and of crop development is changing and will change for a thousand years.

Mr. **Buchanan.** I have no doubt it will change. There will be a gradual change, a gradual development.

Dr. **Ball.** But if you put on the map just what you are to do for a soil nobody would stand by the map for any length of time at all. You must not ask us to do that. They do that in the almanac.

Mr. **Buchanan.** They do that where?

Dr. **Ball.** They do that in the almanac.

Mr. **Buchanan.** Yes; and an almanac is more popular than your map.

Dr. **Ball.** Yes, and when the year is done it is thrown away.

Mr. **Buchanan.** No; it is kept for ten years.

Dr. **Ball.** You take the almanac to find out when the sun rises.

Mr. **Buchanan.** I am a practical farmer—I have been, but I am not a scientist. A farmer isn't a scientist. He is a practical man.

Dr. **Ball.** But you want this map to be the whole compendium of agriculture. If we did that we could not do the soil survey.

Mr. **Buchanan.** Let me show you my position. I am a practical farmer down there and have been one. I take your soil map, I read about my soil as you have described it, and the elements it contains. Well, I say when I want to know now what is the matter with my corn, what is the matter with my cotton? I want to know what fertilizer I can use to make a good crop, and the survey of soil, this map does not state it.

Dr. **Ball.** Suppose that map did state it, it was written 10 years ago, and it gives the fertilizer that was on the market 10 years ago.

Mr. **Buchanan.** I do not say the fertilizer on the market. I said the necessary character, the elements that it lacked. For instance, they all lack potash.

Dr. BALL. Suppose it lacked a certain element it might be necessary to employ for that a certain ingredient in order to make it available on that certain soil.

Mr. BUCHANAN. I am talking about that soil. You can not tell me these soils change so rapidly as that.

Dr. BALL. But our science changes.

Mr. BUCHANAN. I tell you my soil that has only two-tenths of 1 per cent of potash in it will lack that potash for 50 years.

Dr. BALL. The statement is made in the Soil Survey report that fertilizers are necessary in a given region and the general practice of the region is carefully determined and stated in the soil survey report.

Mr. BUCHANAN. Then how much potash ought to be in the soil to produce cotton?

Dr. MARBUT. That is another story.

Dr. WHITNEY. That is a debatable question.

Mr. BUCHANAN. Why can you not say what it ought to be?

Dr. MARBUT. Because we haven't got that far yet—that is why.

Dr. WHITNEY. Nobody knowns.

Dr. BALL. If we had solved all the problems of agriculture and could write a finished book on agriculture we would not be asking for money for anything except to publish it.

Mr. BUCHANAN. It is a strange thing that we have an Agricultural Department that has been for years studying this thing and when I go to it now it can not give me a recommendation of how to fertilize a tract of land, the elements of which they know, in order to make a given crop.

Dr. MARBUT. They can and are willing to do it.

Dr. WHITNEY. They can.

Mr. BUCHANAN. That is all I ask.

Dr. BALL. But we are not willing to put down on the map that this will be the fact 100 years from now or 5 years from now.

Mr. BUCHANAN. I do not ask that.

Dr. BALL. We are putting out a map that will be a map of this soil for generations to come.

Mr. BUCHANAN. What is necessary for me to do now?

Dr. WHITNEY. You have your county agent.

Dr. BALL. You have your county agent and your agricultural colleges.

Mr. MAGEE. That is a thing I am interested in. I would like to get to this work of the county agents.

Mr. BUCHANAN. County agents are not qualified. I make that statement boldly, because I know several of them. They are not qualified. They are qualified for certain things, but they are not all-round men on their fertilizer proposition.

Dr. BALL. And you are asking us to put down on a map which is to be a map which we are not to go over—otherwise we would have to go over them and reissue them every little while. You are asking us to put down on a map the final results of investigations that it will take a hundred years to work out.

Mr. BUCHANAN. I am not.

Dr. BALL. That is what you are doing.

Mr. BUCHANAN. You have made some progress along this line.

Dr. **Ball.** And we are putting in the map all the knowledge we have of the soils.

Mr. **Buchanan.** You do not get my question. You will go off far ahead of my question. When you make a soil survey of my county and find it is deficient in potash, you state the amount of potash it has?

Dr. **Ball.** Yes, sir; but not usually in the soil-survey report, because by the time the report and map are published this chemical data has not been completed.

Mr. **Buchanan.** And you know reasonably well how much it ought to have in order to produce a good growth of cotton and corn.

Dr. **Ball.** If we know it, we are mistaken in not putting it in. You are crediting us with more knowledge than we have.

Dr. **Whitney.** It is a debatable point. It is a popular mistake, if you please.

Dr. **Ball.** It is a popular fallacy that the chemical examination of a soil will enable a chemist to know what to add to that soil to produce a crop. That is a fallacy.

Mr. **Buchanan.** What do you know from it?

Dr. **Ball.** When we make an examination of a soil we learn certain things, for instance, its physical composition, the chemical composition.

Mr. **Buchanan.** What benefit is it to know the physical composition if you do not know what to add to make it better.

Dr. **Ball.** That gives us information on what to base our research, which will give us results.

Mr. **Buchanan.** I think we had better stop the survey of these soils.

Dr. **Ball.** If we do not survey the soils we will not have the basis to find what will improve them.

Mr. **Buchanan.** You may never find out.

Dr. **Ball.** We are finding out all the time. We are improving the fertilizers for crops every year. We are working that out on the soil.

Dr. **Whitney.** May I give you an illustration?

Mr. **Buchanan.** Yes, sir. Everything I am interested in is agriculture. If there is anything I want to do it is to see the theories that you are studying out; some of them are beneficial, but I want to see sufficient practical results put down in your work, so that the farmer will get the benefit of it and not depend on traveling lecturers, who have grown in disrepute with the farmers. That is a fact. They have grown in disrepute with the farmers. They claim their theories department-clerk theories, coming down there to instruct them to raise crops, cotton, corn, or potatoes—the farmers claim that they have been raising these crops all their lives, and they doubt whether these fellows have ever raised a crop. It is all theory and not practice. I am talking to you all in order to benefit the future, so that we can quit arguing and carry the information from the book or the map or the circular, whatever it is, to the farmers.

Dr. **Whitney.** Mr. Buchanan, about 70 years ago the Rothamstead Station was established in England to determine that very point. Sir John Lawes thought he could determine exactly what fertilizers were needed for crops. He put out a series of experimental plats that have been running for over 70 years. On one plat he put no fertilizer, and wheat has been growing continuously on it for 70 years without fertilizer. The first year he got a yield of 18 bushels of wheat per acre. The last year, the last year of record, the yield had decreased to 9 bushels per acre, as I recall—about 9 bushels. That soil has been going down through continuous cultivation of wheat from 18 bushels to 9 bushels in 71 years.

We have all considered that a very striking illustration of the need of fertilizer. On the plat upon which he used complete fertilizer his yield has gone up, and he has maintained about 30 bushels of wheat per acre for 70 years by the use of commercial fertilizer.

Then, he took another field, which he called Agdell field, where he rotated his crops. He had turnips, barley, a legume, and wheat. I do not remember the rotation now, but he only got a crop of wheat every fourth year. The average yield of wheat, where no fertilizer was used, was up to 1911, 26 bushels.

Mr. BUCHANAN. Every fourth year.

Mr. LEE. Without fertilizer.

Dr. WHITNEY. Yes, sir; without fertilizer at all.

Mr. BUCHANAN. He seeded it with legume crops.

Dr. WHITNEY. He has maintained that at 26 bushels. Where he added fertilizer, a complete fertilizer, with his rotation, he got an average of 34 bushels. He had maintained an average up to 1911 of 34 bushels. I want to tell you something that is startling and striking, and that has staggered the world.

I do not know that you have heard this, as it has recently come out, on the Agdell field, where wheat has been grown in rotation without fertilizer, the last crop harvested, instead of giving an average of 26 bushels, returned in 1915 only 4.8 bushels, and in 1919 only 5.7 bushels.

Mr. BUCHANAN. All right.

Dr. WHITNEY. Where he had used fertilizer, complete fertilizer, and had up to 1911 obtained an average of 34 bushels, he got in 1911 a crop of 11.9 bushels, and in 1919 a yield of 9.9 bushels, and these seasons were not unusual, because the crops on his other field had not shown their effects. It has gone all to pieces.

Mr. BUCHANAN. Both of them?

Dr. WHITNEY. Both of them, and they have no idea what is the matter.

Mr. BUCHANAN. As both of them went to pieces, the fact that one was fertilized and the other not, and the other rotated and the other not, may not have been any contributive cause of them going to pieces.

Mr. WHITNEY. No; I beg pardon. On the other field, where he had the plats continuously in wheat, with fertilizer, he is still getting 30 bushels.

Mr. BUCHANAN. That is rotating the crop?

Dr. WHITNEY. No.

Mr. BUCHANAN. Continuously in wheat; no fertilizers?

Dr. WHITNEY. Yes, sir; with fertilizer.

Mr. BUCHANAN. If he was able to determine the necessary fertilizer, and even determined the quantity to put on that land, knowing the elements of the land——

Dr. **Ball** (interposing). You are coming right back to it. This problem you are putting to us involves not only the question of adding this fertilizer; it involves the question of the relative cost of the fertilizer to the increased cost of the crop.

Mr. **Buchanan**. No; it does not. Tell the farmer what will benefit his crops. He has more sense than you think he has.

Dr. **Ball**. It is a question of alternating possibly, but whether he shall rotate——

Mr. **Buchanan** (interposing). No; that is not what I wanted. I want him to know the fact as to what will benefit his soil——

Dr. **Ball**. That is stated.

Mr. **Buchanan**. So far as it will increase production.

Dr. **Ball**. That is stated.

Mr. **Buchanan**. No; it is not.

Dr. **Ball**. I beg pardon. We tell you what the soil lacks and the general principles of what it requires for a crop; our suggestion of what it is. We do not mean to say you shall add so much to produce cotton or corn, because that involves the problem of the fertility of the soil, the number of bacteria in the soil, the amount of humus, and the water content of the soil.

Mr. **Buchanan**. It is essential for the farmer to know how much to add in order to apply it.

Dr. **Ball**. There is not any such thing as what we would call a shotgun, or a blanket recommendation for all soils, for all conditions, for all years, and for all men.

Mr. **Buchanan**. I am not asking for a general formula in the United States, one formula.

Dr. **Ball**. There is not any general formula for any soil at any time. We must correct the idea that you can make a chemical analysis of a soil and immediately say just what to add to that soil.

Mr. **Magee**. Let me see if I understand your position. Your position is that it is not scientifically known?

Dr. **Ball**. It is not known; it is not scientifically possible to do that.

Dr. **Whitney**. Let me bring you an illustration right now. Twenty-five years ago, or a certain time ago, hens laid a setting of eggs: I think the average now for the United States is 50 eggs a year.

Dr. **Ball**. Eighty.

Dr. **Whitney**. It was 50 some time ago.

Mr. **Magee**. Fifty per hen?

Dr. **Whitney**. Yes, sir. Now they have hens that lay over 300 eggs a year. No one could have foreseen that, or stated, or no one now can state——

Mr. **Buchanan** (interposing). You go far in advance of your present knowledge. All I want is what is now known by the Agriculture Department, about so much fertilizer containing a certain amount of potash or any other element that you might say would benefit corn production. That is all I want you to state.

Dr. **Whitney**. So much depends on the farmers.

Mr. **Buchanan**. I am a farmer. I see that my soil is deficient in potash. I would like to remedy that. I do not know how much potash to add. I know the fertilizers, or I can find fertilizer that contains potash, and I am willing to rely on the statement of the companies who make it, reliable companies—I will take their statement that it contains potash, and I want to know how much to put on my soil. I read this soil survey and the recommendations. Where am I to find it? I am an ordinary farmer now engaged in tilling the soil. I want to know the one fact, how much potash more I shall add to my land?

Dr. WHITNEY. It does not depend on that.

Mr. BUCHANAN. I am using that as an illustration.

Dr. WHITNEY. It depends on rotation. It depends on what you have done with the soil.

Mr. BUCHANAN. I raise cotton one year and then corn. Your rotation helps some. I understand that, and I want to find out how to fertilizer my land, and I can not do it, and the Government is spending a lot of money trying to do something——

Dr. BALL (interposing). You can find it out, but the soil survey map is not the place to find it.

Mr. BUCHANAN. It ought to be the place where it can be found.

Dr. MARBUT. As an illustration of what we do, let me say that we find during the survey of a county that so much fertilizer is being used on this soil and so much on that soil. We find that the experience of the region shows that good results are obtained by this practice.

Mr. BUCHANAN. That answers my question.

Dr. MARBUT. That information is given in every report.

Dr. BALL. That is in the report, not on the map.

Mr. BUCHANAN. The report accompanies the map?

Dr. MARBUT. Yes. Another thing we do is to cooperate with the local stations. We determine the soil individual; the soil type. We determine that here is an area, for example, of one kind of soil: over here is an area of the same kind, and over here is still another area of the same soil. Neither the experiment station nor anyone else can go to the expense of experimenting on every farm within each of these areas of a given soil type. The station, therefore. selects an area where the soil of this type is typical and where other conditions are favorable for experimentation. It lays out a number of experiment plats and by the use of different fertilizers and different crops finds out how much fertilizer of a given kind gives the best results on this area. The soil survey has already determined the arena or areas where this soil type is found. Since the soil is the same in all, it is reasonable to conclude that the same practice throughout the whole area will bring equally good results. The soil survey enables the experiment station to say, "On this land. etc., such a treatment will give the best results."

Mr. BUCHANAN. It enables you all to say it.

Dr. MARBUT. Our function is to make the soil survey. The experiment stations want to do the experimental work. It is not the function of the soil survey to make such experiments.

Dr. BALL. It would take 15 years of experimentation work in connection with the soil survey in order to arrive at results that would be conclusive.

Mr. BUCHANAN. You have only a few experiment stations for the whole area of the United States?

Dr. BALL. One in each State.

Dr. WHITNEY. They have substations.

Mr. **Buchanan.** You have few substations compared with the area.

Dr. **Marbut.** We do put down in the report what is being done, the crops grown, what the farm practice is that makes the most effective crop of every different type of soil.

Mr. **Buchanan.** If you had told me that to start with, it would have saved a lot of talk. That is what I am contending for.

Mr. **Lee.** I doubt if that is a soil survey map that you have. They only give you 2,000, you know. You say you have eight or ten thousand of them.

Mr. **Buchanan** I inherited them from Mr. Burleson.

Dr. **Whitney.** There were 4,000 maps printed. That is fixed by law; unless Congress itself reprints we can not reprint, and there were 2,000 copies went to the Congressman.

Mr. **Magee.** For every county?

Dr. **Whitney.** Yes, sir.

Mr. **Buchanan.** Have you made a soil survey of any other counties in my district? Would you know the counties if I mentioned some of them?

Dr. **Whitney.** Yes, sir.

Mr. **Buchanan.** Washington, Burlington, Lee Williamson, Travis, Austin?

Dr. **Marbut.** No. The old survey of Washington County was made 15 years ago. There are none made for the other counties that you have mentioned.

Mr. **Magee.** Is there any further general statement you desire to make or shall we go on to the items?

Dr. **Whitney.** We will go on to the separate items if you wish.

FOR CHEMICAL INVESTIGATIONS OF SOIL TYPES, ETC.

Mr. **Magee.** Then we will take up the item on page 134, for chemical investigations of soil types, etc., for which you ask $23,110.

Dr. **Whitney.** I have nothing special to say about that, except that the work is going on. It is continuing work. It is work carried on in connection with the soil surveys and in connection with our work on the study of soils in general.

Mr. **Buchanan.** How much have you spent out of the current appropriation during the first six months of this year?

Dr. **Whitney.** We have spent all that we are allowed to spend; that is to say, we are running right up to the limit of our appropriation. It is a small appropriation.

Mr. **Buchanan.** You will use it all?

Dr. **Whitney.** Yes; we will use it all.

Mr. **Magee.** Do you use about the same amount each month?

Dr. **Whitney.** We apportion it by quarters; under the law it is apportioned by quarters, and we spend about the same amount each quarter.

Mr. **Magee.** What do you do under this provision?

Dr. **Whitney.** We have a force of chemists who are analyzing soils sent in by the soils survey. That is one thing. Then, we are analyzing soil samples that are sent in by other bureaus and other departments of the Government. We do a great deal of work for other bureaus in the Department of Agriculture, quite a lot of work with the investigations in connection with the Department of Justice and the Post Office Department.

Mr. BUCHANAN. The Department of Justice?

Dr. WHITNEY. Yes, sir; for land prosecution cases, for frauds.

Mr. MAGEE. How is that work applicable to this appropriation, the investigation of lands in litigation?

Dr. WHITNEY. Well, in connection with our soil surveys and with our general knowledge of soils we are called on——

Mr. MAGEE (interposing). You mean in reaching the valuation of land?

Dr. WHITNEY. Yes; in reaching a valuation and determining whether fraudulent claims have been put out in regard to the value of these lands.

Mr. MAGEE. You mean as to the character of the soil?

Dr. WHITNEY. Yes, sir.

Mr. MAGEE. The composition?

Dr. WHITNEY. Yes, sir.

Mr. BUCHANAN. Does the Department of Justice reimburse your bureau for the labor you perform?

Dr. WHITNEY. No.

Mr. BUCHANAN. Do you think that such expenditure of the money granted under this appropriation comes within the spirit and intent of it?

Dr. WHITNEY. Oh, yes.

Mr. BUCHANAN. You conceive that it is the province of your department to forward the agricultural interests of the Nation?

Dr. WHITNEY. Yes, sir. We have authority in our appropriations for cooperating with other departments, not in this particular item, but in the item for the soil surveys, and this chemical work is tied up with the Soil Survey.

Mr. BUCHANAN. I have not noticed the particular verbiage of the Soil Survey, but I think you are going beyond your jurisdiction altogether. The item to which you refer reads:

> For the investigation of soils in cooperation with other branches of the Department of Agriculture, other departments of the Government, State agricultural experiment stations, and other State institutions.

That provides for cooperation but not for doing work for them. I do not believe the Agricultural Department should be an adjunct of the Department of Justice in the prosecution of crime. I think it is only for the purpose of furthering the agricultural interests of the Nation, and I think that is a perversion of the appropriation.

Dr. WHITNEY. In all of our Government departments there is and always has been the practice of cooperating wherever we are doing something that is essential to their work that they can not do. The departments have all called upon other departments in questions of that kind, and we have always encouraged it.

Mr. BUCHANAN. And it should be done when legally authorized by law. I believe in cooperation between the different branches of the Government, but I do not believe cooperation should transcend or go beyond the law. If that is done, we have no checks or limitations upon the various departments, and I do not believe that under the paragraphs I have seen you are authorized to make any chemical analyses for the Department of Justice in connection with the prosecution of the criminal laws of the United States.

COOPERATION WITH DEPARTMENT OF JUSTICE.

Mr. **Magee**. How much work have you done for the Department of Justice this year?

Dr. **Whitney**. We cooperated with the Department of Justice in a case before the Supreme Court, in an original case connected with the boundary line between the State of Texas and the State of Oklahoma. We cooperated with them in the soil survey and also in the chemical laboratory work. It was not a great deal; altogether I think we spent about three or five weeks with four or five men to give them information that the Government felt was essential to the consideration of their case. This was a Government agency prepared to do that kind of work and they could not have gotten that work done in any other way.

Mr. **Magee**. If you had not done it and it had been done by outside parties the Government would have had to pay for it?

Dr. **Whitney**. Yes, sir; in fact, they paid some of their experts on other phases of their case a great deal more money than we expended.

Mr. **Buchanan**. The point is this: The litigation you speak of is practically litigation between two States and between the individuals of two States. There is some little claim made to the bed of the river by the Federal Government, but, of course, a survey would not have been necessary as to the bed of the river. Therefore this is public money expended in connection with litigation between two States and between individuals of two States, and it should not have been a burden upon the Treasury of the United States.

Dr. **Whitney**. But it was litigation to which the Government of the United States was a party.

Mr. **Buchanan**. It was a party to the extent of the bed of the river. It had no claim and did not allege any claim except to the bed of the river, and a soil survey was unnecessary as to the bed of the river covered by water.

Mr. **Magee**. The work you performed was performed at the request of the Department of Justice?

Dr. **Whitney**. Yes, sir.

Mr. **Wason**. Did you make an analysis of the soil?

Dr. **Whitney**. Yes; we made an analysis of the soil. This is something we have always done. We have always responded, when we could, to requests from other bureaus, and we are cooperating now.

Mr. **Magee**. Is this the appropriation under which you determine the deficiency in soils?

Dr. **Whitney**. Yes; we are working on that, but there is also a division in the Bureau of Plant Industry which is carrying on what they call soil-fertility investigations.

Dr. **Ball**. But the part of the work that belongs to the Bureau of Soils is done in this division.

Dr. **Whitney**. The Bureau of Standards is engaged on a study of the corrosion of pipes, gas mains, and water mains. Now, we have entered into cooperation with them because of our soil knowledge, and we consider it perfectly justifiable, when another Government department is engaged on something which pertains to them and their work and they ask our cooperation on a phase of the work that pertains to our bureau, to extend cooperation.

Mr. Magee. My own legal opinion is that you have acted within your authority. That is my own opinion.

Dr. Ball. I think that general authority is given to the whole department.

FOR PHYSICAL INVESTIGATIONS OF THE IMPORTANT PROPERTIES OF SOILS.

Mr. Anderson. The next item is found on page 135 and is for physical investigations of the important properties of soil which determine productivity, etc. Tell us what you do under this item.

Dr. Whitney. It is a very small appropriation as Government appropriations go, $12,225, so that there can not be very much done, but what we are doing, I think, is very efficiently done. Under that we are making physical analyses and mechanical analyses of samples for the soil surveys. We are also working on the physical properties of soils, studying the physical properties of soils.

Mr. Anderson. What do you mean, the texture of a soil?

Dr. Whitney. Its texture and water-holding capacity, drainage, and things of that kind.

Mr. Anderson. These investigations, I take it, are laboratory investigations?

Dr. Whitney. Yes, sir.

Mr. Anderson. Just how do they apply, in a practical way, to agriculture, road construction, or anything of that kind?

Dr. Whitney. In the first place, they have permitted us to separate our soil types according to grades of material; that is a mechanical analysis, and we have been doing that for years. We handle hundreds of samples every year. Then we have devised a great many pieces of apparatus to help both in the field and in the laboratory. For instance, the question of alkali in soils. We devised an electrical machine that permits us to determine the percentage of alkali in the surface soil or in any depth of the soil down to 6 feet or deeper if we can get samples up. That has permitted us to make these alkali maps showing the location and the accumulations at any point below the surface that we can reach with an ordinary auger. This has permitted that whole alkali region to be handled intelligently. Before that there was no way and there were hidden deposits of alkali, sometimes 3, 4, or 5 feet below the surface, that would come up when the land was irrigated. With the apparatus we have devised there is no danger any longer of that, because we can probe the soil and find out what there is below the surface.

Mr. Anderson. On what work are you engaged under this appropriation?

Dr. Whitney. We are working particularly on the physical properties of the colloidal material of soils, the way it holds the particles together. Some soils, as you know, are loose and friable; others are hard and impervious when they are dry; some are very plastic and very sticky when they are wet, and others are not. We have succeeded in separating the colloidal material that gives plasticity to the soils. We are studying that and we are studying its constitution; we are studying it both from the chemical standpoint and from the physical side.

FOR EXPLORATION AND INVESTIGATION OF POTASH, NITRATE, ETC.

Mr. **Anderson**. We will take up the next item on page 136, the potash item.

Dr. **Whitney**. There is one statement I want to make. As shown in the text we have asked for a change in the title of the appropriation, without any change in the activities or any change in the purpose of the work. That is done to prevent any appearance of duplication with work being carried on by the Geological Survey and the Bureau of Mines.

Mr. **Anderson**. It seems to me you have jumped out of one fire into another, and made it appear that this is a duplication of what is being done by the Bureau of Plant Industry.

Dr. **Whitney**. No; this is an investigation of fertilizers and is not the investigation of their effect on plants.

Mr. **Anderson**. All right. Tell us what you are doing under this item.

Dr. **Whitney**. You will remember that in the last Congress, when this matter was up for discussion in the Senate, a letter was written by the Director of the Geological Survey and one by the Director of the Bureau of Mines stating that there was a duplication of work.

Mr. **Anderson**. I do not recall that incident.

Dr. **Whitney**. I have the letters here if you care to look at them. As a result of the statements made on the floor of the Senate, the Secretary directed me to get in touch with the chiefs of those bureaus, which I did. We went over the whole matter, and they said the statements had been called for by telephone and were to be delivered immediately, so that they had no time for consideration. They only looked at the wording of the appropriation and said that in substance that would cover work that both of those bureaus were authorized to do; that there had been no real duplication of work and that we had cooperated. We were then cooperating and we are now cooperating with the Geological Survey and the Bureau of Mines, but in order to prevent any suspicion or any indication of any possibility of duplication, we decided in conference to change the appropriation to the form in which we have it here.

Mr. **Anderson**. My recollection is that we combined this item last year with the nitrate item. I am quite sure there were two or three items combined last year, were there not?

Dr. **Whitney**. No.

Mr. **Anderson**. There was an increase in this appropriation, and my impression is that it had something to do with some sort of nitrate work.

Mr. **Davis**. There was a request last year for a special appropriation, but that was new and it was combined with this original appropriation.

Mr. **Anderson**. That is what I had in mind. Then there was a new item in the estimates which we combined with this item.

Dr. **Whitney**. Yes.

Mr. **Anderson**. Tell us something of what you are doing under this item.

Dr. **Whitney**. Under this item we are continuing our investigations of the possible sources of potash supplies in this country. That is work which was started under President Taft, when we had trouble with the German syndicate, and Congress directed us to investigate sources of supplies of potash and other fertilizer material in this country.

We have been working on kelp, as you know.

Mr. ANDERSON. That is finished, is it not?

Dr. WHITNEY. Yes, sir; we are not doing any work on that now. We have been finishing that up. We are working on the possible production of potash from cement plants and from blast furnaces, both of which are very large potential sources of supply. We use about 240,000 tons of potash in this country a year and we estimate that there is lost from the cement industry 87,000 tons, I think, and from the blast furnaces about 100,000 tons.

Mr. ANDERSON. Are the blast-furnace people or cement people making any potash now?

Dr. WHITNEY. Very little, sir; everything is stopped on account of the depression and the large stocks of potash that have been accumulated in this country.

Mr. ANDERSON. Is it likely that it will be possible to produce potash from blast furnaces or cement works in competition with German potash?

Dr. WHITNEY. We think so. It is a waste product, and they have to clean the gases and they have to prevent the passage of dust out into the atmosphere. It is a question of devising methods by which it can be gotten out in a form that can be used at not too great expense.

Mr. ANDERSON. Is not that machinery developed now?

Dr. WHITNEY. No, sir.

Mr. ANDERSON. We had it during the war, did we not?

Dr. WHITNEY. We never have made any commercial potash from blast furnaces, and we are trying to get them to introduce the methods now. There are two or three blast furnaces that have been tried out on a commercial scale, and I am satisfied that it can be done. From the cement mills we did get potash during the war, but in many cases it was at too great cost. There have been two instances, and there is one now that is operating and producing considerable potash by a modified method we suggested. That is in California. They are making it, but are not selling it. They are storing it up because of the depressed and uncertain state of the potash market at the present time; but as soon as this temporary condition is eliminated, that exists in other lines, as well as in the fertilizer market——

KELP EXPERIMENT.

Mr. LEE (interposing). Was the kelp experiment a success?

Dr. WHITNEY. Yes, sir; we think it was a success. It was an experimental plant, and it was not a commercial success in our hands, because we had to use it as an experimental plant. However, we think the methods have geen worked out, and we are trying now to sell that plant as a going concern.

Mr. LEE. I thought there were some private concerns that were adopting those methods.

Dr. **Whitney**. They have all been given up on account of the general depression of business and the general uncertainty about the fertilizer-material market.

Mr. **Anderson**. That kelp plant in California is not in operation now, is it?

Dr. **Whitney**. No, sir.

Mr. **Anderson**. You are trying to sell it in its present physical shape, without dismantling it?

Dr. **Whitney**. Yes, sir; as a going concern.

Mr. **Anderson**. It is not a going concern if you are not manufacturing anything there.

Dr. **Whitney**. But we will sell it in a condition to run.

FOR THE INVESTIGATION AND DEVELOPMENT OF METHOD FOR FIXING ATMOSPHERIC NITROGEN IN FORMS SUITABLE FOR FERTILIZER USE.

Mr. **Anderson**. Are you doing anything in connection with the nitrogen fixation work?

Dr. **Whitney**. Yes, sir; we are cooperating with the work that is going on at the American University. We still have a force of men out there cooperating with them. If you will remember, it was originally our plant. It was a plant that we had out at Arlington, and that was moved over there under the war conditions and placed under Army control. We are still continuing the investigations in cooperation with them.

Mr. **Anderson**. How much money is being expended on the nitrate end of it?

Dr. **Whitney**. We have four men, I think, out there, and we have a unit of the work which is separate and distinct from the other.

Mr. **Anderson**. Are you getting anywhere with it?

Dr. **Whitney**. Yes, sir.

Mr. **Anderson**. You think you are?

Dr. **Whitney**. Yes, sir; it is one of those things that the world is very much interested in, and all of the principal countries of the world are working on it.

Mr. **Anderson**. What is the object of your investigations? Is it to develop other methods or better methods?

Dr. **Whitney**. It is to devise a method of getting a supply of fixed nitrogen to meet the needs of the world.

Mr. **Anderson**. There are two methods, the Haber and the cyanamid method. Are not those methods already developed?

Dr. **Whitney**. It is not made in this country by the cyanamid method.

Mr. **Magee**. The plant at Muscle Shoals is a cyanamid plant.

Dr. **Whitney**. It is not operating.

Mr. **Magee**. It is ready to operate.

Dr. **Whitney**. That is a War Department plant, and this work at the American University is being carried on in the interest of that plant. These investigations are going on, but the plant is standing still.

Mr. **Magee**. I suppose it is standing still because there is no need for operating it, but if the Government needed to produce nitrates there it could be operated. They could start up the plant and make them.

Dr. **Whitney**. No, sir; there is no authority. They could not start up the plant without authority from Congress.

Mr. **Magee**. The plant has been built and is ready for operation. Now, you can not get nitrates nearly as cheaply under that process as you can under the Haber process, can you?

Dr. **Whitney**. Yes, sir; you can get it cheaper under the cyanamid process. We think that the Haber process is going to be eventually the better process.

Mr. **Magee**. It is now, is it not?

Dr. **Whitney**. No, sir; it is not in practical operation.

Mr. **Magee**. Yes; they have a plant at Syracuse, which is probably the best plant in the country.

Dr. **Whitney**. That is the only plant in operation in the country.

Mr. **Magee**. Why do you say there is no plant in operation? They are making nitrates now.

Dr. **Whitney**. It has only been in operation about four months.

Mr. **Magee**. But it is in active operation and is a big plant.

Dr. **Whitney**. They are making about 10 tons of ammonia per day for the chemical industry, and not for the fertilizer industry.

Mr. **Magee**. It is a fixation plant, is it not?

Dr. **Whitney**. Yes, sir.

Mr. **Magee**. Producing nitrates by the Haber process?

Dr. **Whitney**. Yes, sir.

Mr. **Buchanan**. There is one in operation at Niagara Falls, is there not?

Dr. **Whitney**. That is a cyanamid plant on the Canadian side. So far as I know, it is in operation.

Mr. **Anderson**. With those two processes in operation, I would like to know the purpose of this work. Is it directed toward the improvement of the present methods or the development of new methods?

Dr. **Whitney**. It is directed toward the improvement of the present processes. Of course, the principal work that is going on in the nitrogen-fixation investigation is not under the Bureau of Soils, but that is a separate organization in the department that has come over from the War Department. They have come over with an allotment from the President's original defense fund; but we are continuing our work and developing our ideas on our part of this nitrogen-fixation work.

Mr. **Buchanan**. I want to know why it was that the appropriation for this purpose was increased from $36,840 for 1921 to $86,840 for 1922.

Dr. **Whitney**. That is because Congress gave us an increase.

Mr. **Buchanan**. I understand that, but for what reason?

Dr. **Whitney**. To expand our work.

Mr. **Buchanan**. There is a great deal of talk about getting back to the prewar basis on these appropriations, and unless there is some good reason for more than doubling the appropriation——

Dr. **Whitney** (interposing). That was after the war.

Mr. **Buchanan**. That is why I do not understand it. It has been more than doubled, and there must have been some great necessity for increasing it to that extent.

Mr. **Lee**. It is due to the importance of the work, I think.

Dr. **Ball**. This is the appropriation for the adaptation of the available supplies of fertilizer in the United States to agricultural use. The Geological Survey goes ahead and surveys the occurrence of fertilizers in this country, and the next question is the possibility of getting those fertilizers out and getting them into such form that they will be available for agricultural use. If that is not done, they are not available.

Mr. **Magee**. The cyanamide process requires a great deal more power than is required under the Haber process, and as a practical proposition you can not compete with the Haber process for that reason. Therefore, you might say that the cyanamide process is antiquated.

Mr. **Lee**. For what reason?

Mr. **Magee**. Because it requires so much more power than the other process.

Mr. **Lee**. I can name a place down South where you can get all the power you need for that purpose, and if you will give Mr. Ford a contract he will produce it.

Mr. **Magee**. That is the plant in regard to which the question was raised. It requires so much power to produce it by that method that they can not compete successfully with the Haber process. Is not that your understanding?

Dr. **Whitney**. Yes, sir.

Mr. **Buchanan**. They can furnish cheaper water power down there. They are producing it by that process at Niagara Falls.

Dr. **Whitney**. They are making it on the Canadian side of the Niagara River.

Mr. **Magee**. They have to use the primary power at Muscle Shoals for the purpose, and they can not use the secondary power, unless they supplement it by steam power. The secondary power is an intermittent power. If they depend on secondary power, what will they do when the secondary power is not available? You must supplement it with steam power, and that makes the expense much greater. Are you trying to discover a new process, or are you simply working along the line of trying to improve the existing processes?

Dr. **Whitney**. We are studying along the line of improving the existing processes. As you say, there is a Haber process plant in operation at Syracuse. It was opened about the 1st of August. It is secret, and no one is supposed to know anything about the methods they use. It is for the chemical industry alone, and it is not for fertilizer uses. So far as the cheap production of ammonia for fertilizer use is concerned, it is still an open field.

Mr. **Magee**. That is the branch you are working on?

Dr. **Whitney**. Yes, sir; that is the branch we are working on.

PRODUCTION OF PHOSPHORIC ACID FROM ROCK BY HEAT.

This item also covers our work on phosphoric acid, or the work on the production of phosphoric acid from rock by heat—by the intense heat of a gas furnace or oil furnace. That is getting along very satisfactorily.

Mr. **Wason.** Have you in the last year found out anything and has your bureau given any advice to the public as to the improvement of those methods you have referred to?

Dr. **Whitney.** Yes, sir; we are doing that right along.

Mr. **Wason.** Can you tell us what that is?

Dr. **Whitney.** Well, in the phosphoric acid work that we are doing, we have a plan now, or a small semicommercial plant, at Arlington that is capable of producing about one ton of phosphoric acid per day, but in this high-temperature work it is hard to keep the furnaces from burning out. It is not large enough for continuous operation at that daily capacity, but there seems to be but little question in the minds of the fertilizer manufacturers, or in the minds of some of the fertilizer manufacturers, that these methods will eventually be used when we get all of the details of the cost of production and of factory equipment completed. In work of this kind, and especially in high-temperature work, we run into difficulties that are not contemplated.

Mr. **Wason.** Those are practical difficulties that you speak of. Now, let me ask you this: If you are successful in working out in your plant results along the line you have indicated, who will get the benefit of those results or studies?

Dr. **Whitney.** The farmers.

Mr. **Wason.** How will they get the benefit of them?

Dr. **Whitney.** We are going to be able to produce acid phosphate in a more concentrated form. We will be able to obtain this phosphoric acid from the ordinary run-of-the-mine stuff, and it is going to lengthen very materially the life of our phosphate deposits. The present method of mining phosphate rock is, perhaps, known to some of you. I know that the fields of Florida and Tennessee have been gone over to get out the very high-grade rock, or that containing 75 to 80 per cent phosphate rock. They have gone over the whole field for many miles, and have practically exhausted the field of that grade of rock. Now they are going back again to get second grade, or the 70 to 75 per cent rock. They are going to exhaust the field with respect to that grade in a certain number of years. Now, in getting the higher grades out, they threw away much phosphate of a lower grade, including the 70 per cent and 75 per cent rock, which is mixed with foreign material. Now, they are recovering the lower grades of rock, but still throw away a great quantity of phosphatic material, and even in the most careful mining they have in some instances been discarding as much as 65 per cent of the phosphates that are in those beds. Now, the material that they are throwing away is unfit for use in the manufacture of acid phosphate by the sulphuric acid method. This is the material that we can most profitably use in our furnace method. This stuff that they are throwing away is the very material that we can use, commercially.

Mr. **Magee.** What do you mean when you say they throw it away? Do they throw it on the dump?

Dr. **Whitney.** Yes, sir; on the dump.

Mr. **Wason.** If your plans materialize, as you expect they will in the production of phosphoric acid in this country, will that lessen the cost of fertilizer to the country, or will the present prices be continued? I am not minimizing your work, but I am looking at it from the practical point of view. Could my friend, Mr. Magee, purchase fertilizer any more cheaply if your work along that line were entirely successful?

Mr. Magee. I have no occasion to buy any.

Dr. Whitney. Of course, that is a question I can not answer.

Mr. Wason. Your information goes to those large concerns that produce phosphates?

Dr. Whitney. Yes, sir; necessarily so, because the farmer can not use these methods. That is something that must be done by manufacturers.

Mr. Wason. Do not those large corporations who are manufacturing fertilizer have scientific men at work on these problems?

Dr. Whitney. Very little. It is astonishing how little real scientific work they do and how few chemists they employ. They are satisfied with the present methods, and want them to continue.

Mr. Anderson. Are you contemplating putting in larger furnaces so that you can operate on a larger scale?

Dr. Whitney. No, sir; we will not attempt that.

Mr. Anderson. Did you not have that in mind last year?

Dr. Whitney. No, sir; I think I said last year just what I am going to state now, that we hoped to get these methods of manufacture so thoroughly worked out that some industrial concern would be willing to put up, say, $50,000. It would cost about $50,000 to make a commercial furnace, and I have not asked Congress to do that. I have not suggested that, but we do want to get this work in a small experimental way sufficiently advanced to justify them in spending that much money for a commercial try-out. I think we would have succeeded in that if it had not been for the business depression that has made it so difficult to do anything of that kind.

INVESTIGATION OF SOILS—PREPARATION OF MAPS AND PLATS.

Mr. Anderson. For the investigation of soils, in cooperation with other branches of the Department of Agriculture, other departments of the Government, etc., you ask $168,200. That is your large item for soil investigations.

Dr. Whitney. Yes, sir; that is for the soil survey work. We covered that very fully this morning.

EXAMINATION OF SOILS IN CLASSIFICATION OF AGRICULTURAL LANDS.

Mr. Anderson. For the examination of soils to aid in the classification of agricultural lands, in cooperation with other bureaus of the department and other departments of the Government, you ask $15,000.

Dr. Whitney. This is a sort of general work in connection with the soil survey. It does not go into the details. If you care to hear about this, I will ask Dr. Marbut to speak on it.

Mr. Anderson. I think we should have some statement in regard to it.

Dr. Marbut. This fund is expended in cooperation with the Reclamation Service, with the Indian Office, other bureaus in the Department of Agriculture, and with States that want soil surveys made for the purpose of classifying land. That has been done in Minnesota this year, and Michigan is starting with the same thing. Montana is also taking it up.

Mr. **Buchanan**. Is that for the soil surveys of public lands that are to be classified?

Dr. **Marbut**. No, sir; not necessarily public lands. Some of them are private lands.

Mr. **Buchanan**. You make those surveys of private lands?

Dr. **Marbut**. Yes, sir; and of State lands. This applies to undeveloped lands that are to be classified, so that the State can give the proper kind of information to intending settlers.

Mr. **Buchanan**. Those State lands are public lands, are they not?

Dr. **Marbut**. Some of them are State lands and some are private lands. I can not tell you what proportion are State lands.

Mr. **Buchanan**. What I want to know is what business we have providing funds for the classification of private lands?

Dr. **Marbut**. For the same reason that it is our business to make soil surveys of private lands. It is exactly the same thing. It is merely giving information about all the lands of the country. The work of land classification is soil-survey work, plus a little additional information that is used in grouping those lands into broader groups than is usually obtained in making straight soil surveys. This simply includes an additional amount of evidence over and above that given in a soil survey.

Mr. **Anderson**. The majority of the work under this item is done upon State-owned lands, is it not?

Dr. **Marbut**. No, sir: not the majority of it. A good deal of it is done on Government land. The most of it, I believe, is done for the Reclamation Service. I can not answer that question specifically, but I think that most of it is done on public lands for the Reclamation Service. It is done for the purpose of enabling the Reclamation Service to extend intelligently their reclamation projects.

COOPERATION OF STATES.

Mr. **Anderson**. Please tell us what States you are cooperating with and the amount of money they are contributing?

Dr. **Marbut**. There are 29 States.

Mr. **Anderson**. If you have a statement, please put it in the record and show the amount of money received from the States.

Dr. **Marbut**. I have that here. I hope, Mr. Chairman, that you will not insist on our publishing the individual amount of each of the States. We can give you the whole amount and we can give you essentially what each State appropriates, but we have never published it and we have never asked the permission of the States to do so. Unless you insist on it I should prefer not to publish that statement.

Mr. **Anderson**. What is your general basis of division?

Dr. **Marbut**. That is half and half, that half and half meaning half and half of men, not half and half of money necessarily. That is, we put in a man to the State's man. We ask no question of the State as to what salary it is paying its employer or as to what expenses it allows its field men and the States ask no question of what salaries we are paying, but we divide half and half on the basis of men rather than money. The States as a whole, appropriate just a little less than $100,000 a year.

Mr. **Anderson**. Why should the States object to the publication?

Dr. **Marbut.** I do not know that they would. We have never published it up to this time and we should rather hesitate publishing it until we asked the consent of the States.

Dr. **Whitney.** We are supposed to meet the State's appropriation, but we do not pretend to. Some of the States make large appropriations for soil work. They meet us in our cooperative work by putting man to man in the field work. What they do with the rest of their funds, if any be left we do not know. There is a great deal of investigation they can do and we do not check that up at all. We just meet their appropriation as far as we can.

Mr. **Magee.** Do the counties take any action independently of the States?

Dr. **Marbut.** Very rarely. In the State of North Dakota they do. The Bureau of Soils does not undertake to ask the counties for anything.

Dr. **Whitney.** We do not cooperate with the counties. If they cooperate they do it with their State organization.

Dr. **Marbut.** Also in Kentucky, probably once or twice the counties have contributed something and possibly in some other States. We do not attempt to keep track of that; we leave that entirely to the States.

Mr. **Anderson.** Suppose you put in the record the allotment of the Federal funds in each State and leave the State funds out if you think there is any question about it.

Dr. **Marbut.** The statement follows:

Statement of expenses incurred for soil survey field work during fiscal year 1921 in States cooperating with the Bureau of Soils and approximate total contributed by the cooperating agencies.

Alabama	$7, 711. 85
Arizona	3, 250. 42
Arkansas	5, 030. 20
California	3, 209. 94
Georgia	6, 346. 09
Idaho	629. 84
Indiana	4, 112. 74
Iowa	14, 655. 57
Maryland	3, 313. 75
Massachusetts	1, 361. 72
Michigan	3, 123. 62
Minnesota	280. 00
Mississippi	9. 084. 24
Missouri	3, 877. 96
Nebraska	8, 764. 50
New Jersey	4, 190. 69
New York	4, 209. 38
North Carolina	8, 650. 14
North Dakota	1, 688. 50
Ohio	3, 491. 27
Oregon	3, 311. 25
Pennsylvania	1, 383. 07
South Dakota	3, 419. 14
Tennessee	1, 161. 38
Texas	20, 005. 48
Utah	803. 30
West Virginia	626. 06
Wisconsin	6, 431. 54
Total by Bureau of Soils	134, 123. 64
Approximate total contributed by cooperating agencies	97, 825. 00

GENERAL ADMINISTRATIVE EXPENSES.

Mr. Anderson. Take up the item of general administrative expenses on page 140.

Dr. Whitney. That is just our general expense fund of $4,000—nothing special.

Mr. Anderson. There is nobody employed under this item: it is just simply for stationery, etc.?

Dr. Whitney. Stationery and telephone and telegraph service.

Mr. Anderson. You are not asking for any increase in the item?

Dr. Whitney. No, sir.

Mr. Anderson. Can you not get along with less?

Dr. Whitney. No, sir.

Saturday, February 4, 1922.

BUREAU OF ENTOMOLOGY.

STATEMENTS OF DR. L. O. HOWARD, ENTOMOLOGIST AND CHIEF; DR. C. L. MARLATT, ENTOMOLOGIST AND ASSISTANT CHIEF; MR. A. F. BURGESS, ENTOMOLOGIST, IN CHARGE OF GYPSY AND BROWN TAIL MOTH INVESTIGATIONS; DR. A. L. QUAINTANCE, ENTOMOLOGIST, IN CHARGE OF FRUIT INSECT INVESTIGATIONS; MR. W. R. WALTON, ENTOMOLOGIST, IN CHARGE OF CEREAL AND FORAGE INSECT INVESTIGATIONS; MR. J. L. WEBB, ENTOMOLOGIST, ACTING IN CHARGE OF SOUTHERN FIELD CROP INSECT INVESTIGATIONS; MR. C. H. POPENOE, ENTOMOLOGIST, ACTING IN CHARGE OF TRUCK CROP INSECT INVESTIGATIONS; MR. E. F. PHILLIPS, APICULTURIST, IN CHARGE OF BEE CULTURE INVESTIGATIONS; AND MR. J. E. GRAF, FIELD ENTOMOLOGIST, IN CHARGE OF MEXICAN BEAN BEETLE INVESTIGATIONS.

CHANGE IN TITLE OF CHIEF CLERK—PROMOTION OF TWO CLERKS.

Mr. Anderson. Dr. Howard, we will take up first the statutory salary roll on page 141.

Dr. Howard. Yes, sir. There are only two changes, Mr. Anderson, that have been suggested. One is a change of title and the other is a change in the lower salaries, with a total reduction to the roll of $1,000.

Mr. Anderson. You are not going to come back and ask us for some more?

Dr. Howard. I imagine not, sir.

Mr. Anderson, the principal item in our bill is the gypsy moth appropriation.

Mr. Anderson. Let us complete this salary business first.

Dr. Howard. Very well.

Mr. Anderson. Please tell us of the changes proposed.

Dr. Howard. The only change is that of chief clerk at $2,250, if I remember correctly, with a proposed change of title to administrative assistant, and the other change is to drop three clerks at $1,000 each, and substituting for them two additional clerks at $1,600 each.

Mr. **Anderson.** You drop one photographer at $1,200?

Dr. **Howard.** Yes, sir.

Mr. **Anderson.** Is the photographer's place vacant?

Dr. **Howard.** The place is vacant at the present time; yes, sir.

Mr. **Anderson.** Are any of these $1,000 positions vacant?

Dr. **Howard.** I am not sure. I think two of them are vacant at the present time; we could not get people at $1,000.

Mr. **Anderson.** The people that you are asking for in class three are they stenographers?

Dr. **Howard.** I think one of them is a stenographer and the other is a bookkeeper.

Mr. Burgess, in charge of our gypsy-moth work, is in town this afternoon, and if there is any prospect of a long hearing I want to ask that he be heard, because he is anxious to get away.

PREVENTION OF SPREAD OF GYPSY AND BROWN-TAIL MOTHS.

Mr. **Anderson.** Very well. We will take up the item, "Preventing spread of moths," on page 153, in which you are asking an increase of $200,000, and that $100,000 be made immediately available.

Mr. **Burgess.** Mr. Chairman, the appropriation asked for last year was $600,000, and this was on account of the high cost of labor and supplies for the New England work and also for a new infestation of the gypsy moth that was found in New Jersey. At the time that the estimate was submitted there were about 100 square miles known to be infested in New Jersey, centering around Somerville. Later on, the infestation was found to cover a larger area. The appropriation as made was for $400,000 and with that $400,000 it has been impossible during this fiscal year to do the necessary work in New Jersey and the work that should be done in New England along the outside border.

Mr. **Anderson.** How is this fund separated between the New England work and theNew Jersey work?

Mr. **Burgess.** It has not been separated definitely, but we spent last year over $100,000 in New Jersey, and this year we expect to expend, if the $100,000 of this appropriation which is asked to be made immediately available is made immediately available, about $100,000 in New Jersey. The State of New Jersey has appropriated $125,000. Last year they appropriated $112,000, and as they had no field equipment a large amount of their appropriation had to be expended for field equipment. The plan as laid out in the New England work was to scout the outside border, 25 miles wide, the purpose of the work being to prevent the spread, which is the purpose of the appropriation.

I am speaking now exclusively of the fieldwork, scouting work, and clean-up work. In addition to that we are carrying on a system of quarantine work, whereby all shipments of material likely to carry the gypsy moth to outside territory are inspected and certified before shipment can be made. That is another branch of the work. Another branch still is the experimental end of the work, which embraces experiments for developing new and better methods of work, and for the introduction, breeding, and dissemination of parasites of the gypsy moth brought from their native homes. Prior to the war a great deal of work was done in bringing in parasites, particularly from Europe and some from Japan. In fact, when war was declared one of the assistants from our laboratory was in Germany upon that work and was held up there for some time before he was able to make his way back. Conditions after the war closed were such that it did not seem advisable to attempt to resume that work, but it has now been resumed, and we have two men upon their way to take up work in Europe and in Japan, the purpose, of course, being to study the conditions in those countries, and as the gypsy moth infestation increases in the field to find all of the enemies that they can possibly find that attack the insect in its native home and send them to the laboratory in this country where we will breed them, if they can be bred. Of course, they have to be studied and we have to colonize them in the field in the hope that eventually by securing a combination of all the natural enemies that can be obtained we may build up a system of natural control. That is the ultimate purpose of the parasite and natural enemy end of the work.

The quarantine work is to prevent the gypsy moth from being carried long jumps such as might be carried in shipments of lumber or forest products or stone or other material where the eggs may be deposited. The females do not fly. As the results of some of our experimental work it has been demonstrated that the principal means of spread is by the small caterpillar shortly after hatching being carried by the wind, and we are trying to guard the territory west of New England from this insect.

Mr. ANDERSON. As I understand, your work in New England is entirely on the side of control, you are not attempting to exterminate the insect in New England?

Mr. BURGESS. No, sir.

Mr. ANDERSON. Do you require additional funds for that control work?

Mr. BURGESS. We require additional funds, because during the last few years, in spite of the fact that there was almost a 100 per cent increase in the cost of labor and, I presume, an equal increase in the cost of supplies, we received no increase in the appropriations, and furthermore, during the war period we had extreme difficulty in keeping the efficiency of the force at anything like normal, because there were a great many changes as a great many men were constantly leaving.

ACTIVITIES IN NEW ENGLAND STATES.

Mr. ANDERSON. Has there been any spread of the insect in New England?

Mr. BURGESS. We have found the spread this year princiaplly in Massachusetts. The condition in Vermont is practically the same as it was last year. In Massachusetts there has been a rather heavy spread toward the west into the Berkshires, and one of the reasons for that was the fact that we were not able to do any field work in New England last year from the first of December until about the middle of March and we were not able to cover a great many towns in the Massachusetts area that should have been covered last winter.

In so far as Connecticut is concerned, I can not give you definite information, because only a small amount of the border has been scouted. We have to start our scouting in the fall, beginning at the north end of the territory, so as to get as much of that done as possible before the deep snows come. As the snows come we move the men south, so that Connecticut really has always been scouted last.

Mr. Anderson. How much of this money do you expect to expend next year on this control work in New England?

Mr. Burgess. We figure that the cost of the work in New England should be about $400,000; that is, approximately $100,000 more than the appropriation we received a year or two ago. For the work in New Jersey we figure about $100,000. With an appropriation of $600,000, $100,000 being immediately available it would make $500,000 for the present fiscal year and $500,000 for the coming fiscal year. I might say that our original estimate for the current fiscal year was $600,000 and that was based on the conditions as to labor at the time that the estimate was considered, which was a year and a half ago. We have reduced our labor cost about 15 per cent and the cost of supplies has been reduced considerably, so that we felt that with $500,000 equally divided between the present fiscal year and the next fiscal year we could do the necessary work.

Mr. Anderson. Will your present fund be expended before the end of this fiscal year?

Mr. Burgess. Yes, sir. We shall be obliged to discontinue a great deal of our field work by the 1st of April unless we have more money.

Mr. Anderson. The New Jersey work is on the basis of extermination, as I understand?

Mr. Burgess. Yes, sir.

USE OF SPRAYERS.

Mr. Anderson. Is there any prospect of extermination in the New Jersey territory?

Mr. Burgess. We believe that the results during the year that we have been working there have been excellent. In Somerville, the center of the infestation, the number of egg clusters last year was about 3,000,000. This year only 55 egg clusters have been found on the Duke estate, at the center of the infestation. Very thorough work was done in that territory. The outlying infestations are all small and there has been in almost all cases a reduction in the infestation. Of course, that colony can not be exterminated in one year.

Mr. Anderson. I understand that, but if there has been any such extermination as you have indicated, why do you need more money, do you have to go all over the territory again?

Mr. Burgess. Yes, sir.

Dr. Howard. Two or three times.

Mr. Anderson. Do you use power sprayers in this work?

Mr. Burgess. Yes, sir.

Mr. Anderson. What do they cost?

Mr. Burgess. We have several types. The smaller power sprayers that we have that are capable of developing about 600 pounds pressure, fully equipped with hose, etc., will cost around $6,000. That is a motor-equipped sprayer.

Mr. Anderson. How many of those have you?

Mr. BURGESS. We have 18 motor-equipped sprayers and 6 horse-drawn sprayers. The motor-equipped sprayers, however, differ in power. We have three that will give 1,000 pounds pressure. Those sprayers are used for extra-heavy work, where one-half to three-quarters of a mile of hose is used, which is laid through areas that are inaccessible to vehicles. The spraying we do in New England is for the purpose of preventing spread by spraying infested areas that are most likely to be wind swept, where the small caterpillar will be carried by the wind if the infestation is not taken care of. For that reason it is often necessary to spray high elevations, and the motor high-power sprayer is necessary for that purpose.

Mr. ANDERSON. What portion of the year do you spray?

Mr. BURGESS. The spraying is almost all done during the month of June. We figured about 30 days for spraying, dependent on the season, but beginning about Memorial Day and ending about the Fourth of July.

Mr. ANDERSON. For what will you use the $100,000 which you ask to have made immediately available?

Mr. BURGESS. We will use a portion of it for purchasing arsenate of lead and use the balance for labor and miscellaneous supplies. Before the month of June we should buy about 80 tons of arsenate of lead, and we should have all of our equipment in shape and ready to start in as soon as the season is ready. If we have to lay off men by the 1st of April we will have a disorganized force when we come to the spraying season.

Mr. ANDERSON. What do you do the rest of the time when you are not spraying?

Mr. BURGESS. We do scouting work to determine where the infestation is, and the infestations, if they are found, are treated in different ways, depending on the severity of the infestation or the local conditions. If an infestation is found that is fairly heavy, we frequently creosote the egg clusters that can be easily reached and leave the locality so that it can be sprayed in the spring.

If the infestation is rather light, the egg clusters are treated with creosote, which kills them, or it may be that the infestation can be handled by simply banding the trees with sticky material so that the caterpillars can not go up, and under some conditions it is cheaper to do that work that way where the infestation is very small than to put in a big sprayer and lay long lines of hose. Every infestation has to be treated on its merits, but the work from the end of the spraying season until the beginning of the next spraying season is scouting and destroying the gypsy moth in the egg state and getting ready for the spraying season, so as to destroy as many caterpillars as possible after the eggs are hatched.

NATURE AND HISTORY OF MOTH.

Mr. ANDERSON. Suppose you give us a little of the life history of the insect?

Mr. BURGESS. The insect has one brood a year.

Mr. ANDERSON. What is the insect to begin with, the caterpillar?

Mr. BURGESS. We will start as a moth. There is a male and female. The male is a dark brown color. The female has white wings and a large body, sort of buff colored, and is covered with a dense covering of hair. The females lay their eggs from the 10th of July until the middle of July and some a little later.

Mr. BUCHANAN. Where?

Mr. BURGESS. They lay their eggs on the trees and if on the trees always on the trunks or undersides of the limbs, but frequently they lay their eggs on rubbish beneath the tree or on rocks near the tree, and sometimes the female will lay her eggs on the side of a building. The abdomen of the female is so heavy that she can not fly, so the spread by that means is greatly restricted. Of course the males fly, but they do not count any in the spreading of the eggs. The eggs are covered with hair from the body of the female. Usually they make a yellow patch on the trunk of the tree about as large as a quarter of a dollar. The egg clusters will run from 300 with an average of about 500, and occasionally there are very large egg clusters of 600 or 700. Those eggs remain on the trees until spring, and thus they are on the trees the greater part of the year. We can not begin to spray effectively until the leaves are large enough so as to hold the poison. We are ready to spray as soon as the trees come in full leaf and continue spraying until the caterpillars get full grown, which is about the 4th of July. They go into a dormant form then.

Mr. ANDERSON. In that way you expect to exterminate the caterpillars?

Mr. BURGESS. Yes, sir.

Mr. ANDERSON. The rest of the time you are after the eggs?

Mr. BURGESS. Yes, sir; after eggs to prevent the next brood of caterpillars from coming.

Mr. MAGEE. Do they attack the leaves of the trees?

Mr. BURGESS. Yes, sir; the leaves. They molt six times before they become full grown. Their method of growth is by growing to a point as large as the skin will hold them and then shedding the skin and completing that operation six times before becoming full grown. After they have done that once, they are able to feed on the pine foliage, but on a clear stand of pine where there is no deciduous growth to feed on the small caterpillars will die. So a clear stand of pine is safe; but, of course, in New England and, I imagine, in the greater part of the country clear stands of pine are rather rare, and where there is a good deal of deciduous growth mixed in it gives the small caterpillars a chance.

Mr. WASON. Do they feed on the small berries that grow in New England?

Mr. BURGESS. A good many of them. They feed on the huckleberry and the blueberry to a certain extent, and most of the plants of that sort. The ash is about the only tree, or is one of the few trees, the ash and locust, that they do not feed on.

Mr. WASON. They feed on the young birch?

Mr. BURGESS. Yes, sir.

Mr. WASON. And oak?

Mr. BURGESS. Yes, sir.

Mr. WASON. And the maple?

Mr. BURGESS. To a less extent. They are not so fond of the maple as the birch.

Mr. WASON. The small maple?

Mr. BURGESS. Yes, sir; they will feed on those.

Mr. **Buchanan**. What is the extent of their destructiveness of trees?

Mr. **Burgess**. If they continue, the trees die. We have many such records.

Mr. **Buchanan**. They kill the whole forest?

Mr. **Burgess**. Yes, sir; large areas.

Dr. **Ball**. I saw that last year when on an automobile tour, on which I traveled about 250 miles. I was there just about the time that all the trees had been skinned and where the trees were just absolutely bare, and in the southern part of the Massachusetts region, around Cape Cod and down in Connecticut, the majority of the trees were bare.

Mr. **Buchanan**. Bare of leaves?

Dr. **Ball**. Absolutely, in many places just standing like dead timber.

Mr. **Buchanan**. Do they have this pest in France and other parts of Europe?

Mr. **Burgess**. Yes, sir.

Mr. **Buchanan**. Does it destroy forests there?

Mr. **Burgess**. It is one of the most serious pests they have.

Mr. **Buchanan**. What has been their experience in fighting it over there?

Mr. **Burgess**. Unfortunately I have never been to Europe, so that I can not tell you about it first hand, but I understand from men who have been over there that a great deal of the forest growth in Europe is under what you might call cultivation, and, further, that a great deal of it is grown in solid blocks. For instance, their pine or coniferous growths are in solid blocks, and, of course, they would be immune from this particular insect. However, they do have a great deal of trouble with it in their mixed growths, but in Europe they also secure a great deal of benefit from natural enemies and parasites, of which, of course, we do not get the maximum benefit here and which we are attampting to bring in as a part of our control project.

Mr. **Buchanan**. You do not have any hope of stamping this thing out unless you can find a parasite which will breed in such quantities as to combat it, do you?

Mr. **Burgess**. Not in the New England area under present condition, but I believe it can be done in a smaller area.

Mr. **Buchanan**. They lay their eggs under limbs and everywhere, and you might hold them down, but you could not stamp them out.

Dr. **Howard**. We expect to do it in New Jersey.

Mr. **Buchanan**. I know there are lots of hopes that are never realized.

Mr. **Burgess**. We feel very much encouraged.

Mr. **Buchanan**. I hope you will succeed, and I will believe it when I see it.

SPREAD OF INSECT IN NEW JERSEY.

Mr. **Anderson**. Has there been any extension of the New Jersey area this last year?

Mr. **Burgess**. In the scouting work there have been a few infestations found outside of the line that was makerd last year, but that is largely due to the fact that we were not able last spring to cover all of the area we should have covered in the scouting. We were held up last winter on account of lack of funds. I can say this, which is of equal interest, that there have been five towns thoroughly examined in New Jersey where there were infestations last year and none have been found this year, and of 10 outside places in New Jersey where isolated infestations were found last year 7 of those have been examined, and in 4 of the 7 no infestation has been found. When I say they have been examined I do not mean that just a little spot where the infestation was found has been examined, but I mean that the whole town has been examined, because we want to clean those places up.

Mr. ANDERSON. Are these 10 infestations that you speak of scattered?

Mr. BURGESS. They are scattered, and they come about from the fact that on the Duke estate, where the infestation started in New Jersey, they had a large number of surplus trees, and they sold them for a number of years to different parties, sometimes to nurserymen and sometimes to people who were making ornamental plantings. We got the records as to all of the shipments made from that estate and we traced them to the places where the shipments had gone, to Illinois, to Missouri, to Minnesota, to Wisconsin, to Florida, and to the States intervening. One infestation was found in Pennsylvania, as a result of one of those shipments. These other infestations that we speak of in New Jersey came about in the same way. We have been following up those outside infestations. I just give you that information to show that we have made progress.

Mr. ANDERSON. Have you found any infestations west of Pennsylvania?

Mr. BURGESS. No, sir; the one in Pennsylavnia is at Loretta Road, and it was a very small infestation. It was sprayed and careful work has been done since then, and nothing has been found there this year. It will be followed up, of course, but we do not anticipate further trouble from that infestation.

Mr. WASON. These insects are particularly destructive of apple trees, are they not?

Mr. BURGESS. Yes, sir; they are a bad pest to the apple.

Mr. WASON. But in one season they will not kill a tree, will they?

Mr. BURGESS. There are very few trees that are in good condition that will be killed in one season.

Dr. HOWARD. It depends upon the rainfall in August, because the trees put out a second crop of leaves.

Mr. WASON. What has been your experience as to the ravages of this pest, that is, as to the length of time it will take them to absolutely destroy an apple orchard if they are unmolested?

Mr. BURGESS. I am afraid that that is a good deal a matter of opinion, because there are not very many records on that in so far as apple orchards are concerned. If the owner of an apple orchard takes good care of his orchard, prunes it in good shape, and sprays it for other things he can control the gypsy moth in his orchard, but the neglected orchard may be killed off very rapidly. It is a remarkable thing, however, that some of the old trees that do not seem to have a chance for life at all will stand defoliation, not only defoliation but abuse of all kinds, particularly old apple trees. New England is famous for apple trees growing almost everywhere, and a great many seedlings in that country are very hardy. I wish I could give you an absolute answer to your question but it is quite as difficult to answer that question as it is to tell you how long it will take a man to die from tuberculosis. One man will stand it a long, long time while another man will succumb very rapidly.

Mr. **Wason**. Would you think that in three seasons the ordinary apple orchard would be spoiled because of the ravages of this pest.?

Mr. **Burgess**. I should think it would. But there is another factor that comes in there, and that is the rainfall. Of course, your trees are defoliated in June. These trees must put out another crop of leaves and if you have a drought in July they have a very hard struggle because they are developing two crops of leaves in a single year, but if you happen to have a good deal of rain in July that struggle does not injure the trees as badly as if you have a dry season. We have found, from keeping quite a good many records, that there is a great deal higher mortality of defoliated trees during seasons when the rainfall is short in July than when there is a rather abundant rainfall in July.

Mr. **Buchanan**. It would at least destroy all the fruit on the trees?

Mr. **Burgess**. Oh, yes. I want to thank you gentlemen for giving me the opportunity to speak now, because I want to get back.

MAKING PART OF APPROPRIATION IMMEDIATELY AVAILABLE.

Mr. **Magee**. You have a provision here that $100,000 shall be immediately available.

Mr. **Burgess**. Yes, sir.

Mr. **Magee**. You mean for the balance of this fiscal year?

Mr. **Burgess**. Yes, sir.

Mr. **Magee**. You have used up your money?

Mr. **Burgess**. We will have used it for that work by the 1st of April.

Mr. **Magee**. That would make $500,000 for 1922.

Mr. **Burgess**. Yes, sir.

Mr. **Magee**. And $500,000 for 1923.

Mr. **Burgess**. Yes, sir. Of course this would necessitate an appropriation of $600,000, of which $100,000 should be immediately available.

INSECTS AFFECTING DECIDUOUS FRUITS.

Mr. **Anderson**. We will take up the item on page 143, for investigations of insects affecting diciduous fruits, orchards, vineyards, and nuts.

Dr. **Howard**. There is no change in the estimate. $10,000 was made immediately available last year, but we do not ask for it this year.

Mr. **Anderson**. Some of these gentlemen have not heard you expound these bugs, so I think you had better tell us something about what you do under this item.

Dr. **Howard**. Mr. Anderson, I have taken the privilege of bringing some of my head men with me for the purpose of giving them the experience and because they have the actual figures more at their fingers' ends than I have, and if questions are to be asked under this section, I request that you ask them of Dr. Quaintance, who is in charge of this special work.

Dr. **Quaintance**. Our projects under the deciduous fruit insect fund include investigations of and control experiments with insects of the apple, peach, nuts, grapes, etc., and, until recently, the cranberry. We have finished our cranberry project for the present.

Among apple insects, we have been paying special attention in recent years to the cause of wormy apples, the codling moth, which, though it has been worked upon a great deal, there is always room for improvements in treatment. The insect develops somewhat different habits in different localities, and the demand from fruit growers for help along this line is chronic. You will undertsand that the fruit-growing population in a fruit-growing region changes much in a period, say, of five years. New men come in; the sons take the places of the fathers, and there are changes in management So that there is need constantly of instruction along the lines of work already determined, and in the investigations of new points. There is a constant evolution of sprays and improvements in sprays. A spray used 10 years ago might be out of date to-day in certain particulars. For instance, we formerly used arsenate of lead in Bordeaux mixture, and a separate application of nicotine for plant lice. Now, we have learned that we can combine all three of these in one spray, applying them at the same time. Improvements of that kind are constantly going on.

Mr. **Anderson**. How do you get this information to the growers—in the form of bulletins?

Dr. **Quaintance**. Yes, sir; in the form of farmers' bulletins.

Several insects attacking grapes have been quite destructive in the grape-growing regions around the Great Lakes and in Michigan. There were in this territory for some years three or four first-class pests. We have now worked out treatments for them, but there is constant chance for inprovements. In California, the grape-insect work has been limited to the grape phylloxera, and the grape mealy bug. The former has been very destructive in that State in the same way that it has been so destructive in Europe. There is but very little chance to control the grape phylloxera except by using resistant stocks of native species of grapes upon which the phylloxera will not breed to any extent. The work of finding a resistant stock has been in the hands of the Bureau of Plant Industry, and excellent progress has been made. Rather recently we have begun to use fumigants against the phylloxera in the soil, and in that way we hope to be able to save some of the old vineyards on vinifera roots which must otherwise go out in time due to the attacks of the phylloxera.

Mr. **Anderson**. I do not just get what you mean.

Dr. **Quaintance**. There are a number of insecticides which are adapted for use in the soil, like carbon bisulphide——

Mr. **Anderson**. You mean you gas it?

Dr. **Quaintance**. Yes, sir; we gas it. The particular fumigant we have in mind now is one that has rather recently come into use against the peach borer, especially in the East, paradichlorobenzine.

PEACH INSECT INVESTIGATIONS.

One of our other major projects involves peach insects. For a copule of years (1919 and 1920) Georgia peach growers lost very heavily from a fungus disease of the peach and a peach insect known as the plum curculio. This insect, in feeding and egg laying, makes a little hole in the peach, favoring attack by the brown-rot fungus.

Mr. **Buchanan**. In the peach itself or in the tree?

Dr. **Quaintance**. In the fruit. The work last year in Georgia, partly due to favorable weather, was most successful, and there was marketed the largest crop of peaches in the history of the State 10,500 cars.

In addition to a correction or development of the spray schedule for peaches in the South to control these troubles, we have been working there on certain other peach insects such as the peach-tree borer, an insect which attacks the tree at the crown or collar.

The peach borer is found generally east of the Rocky Mountains and costs the peach growers of this area some $6,000,000 a year in damages, and no effective treatment has been discovered until recently. Various washes have been tried and other methods of control, but the bureau has discovered that the chemical with the long name I just mentioned, paradichlorobenzine, is most effective.

Mr. **Anderson**. How is it applied?

Dr. **Quaintance**. It occurs as a crystal which is sufficiently volatile for our purposes at about 55° to 60° Fahrenheit. An ounce of the chemical is placed on the ground around the tree and is covered with soil. In the fall of the year the temperature of the soil is still high enough to vaporize this chemical, and the gas sinks around the base of the tree and kills the borers. We are getting from 90 to 98 per cent control of this serious pest by this treatment.. The method has been taken up rapidly by peach orchardists, and since our first publication on the subject appeared (October, 1919), I think 50 or 60 per cent of the commercial peach orchardists have adopted it.

Mr. **Anderson**. Do they treat all the trees?

Dr. **Quaintance**. They treat trees 6 years of age and over. That was the original recommendation, but we find by careful tests that we can probably apply this chemical to trees younger than 6 years. We hope that by using a half ounce, and under very favorable conditions of application, to treat trees 3 years of age and over.

Mr. **Anderson**. Is it detrimental to a tree if it is younger than that?

Dr. **Quaintance**. There is danger of injury to the trees, especially young trees, due to the thinness of the bark of the young trees, as compared with the older trees.

Mr. **Wason**. Does it affect the fruit?

Dr. **Quaintance**. This insect does not attack——

Mr. **Wason** (interposing). I mean this treatment.

Dr. **Quaintance**. No; not at all.

JAPANESE BEETLE.

Mr. **Anderson**. Is this the item under which you go after this Japanese beetle?

Dr. **Quaintance**. The deciduous fruit appropriation; yes, sir. The work is being done in cooperation with the New Jersey and the Pennsylvania State departments of agriculture, which also furnish funds.

Mr. ANDERSON. It seems to me that is rather new and perhaps you had better tell us something about it.

Dr. QUAINTANCE. The Japanese beetle was discovered in the environs of Riverton, N. J., in 1916.

We made an examination of the situation but could not tell how important the insect would be. There were no funds of consequence for investigations during 1917, though we started a study of the insect as extensively as the money available permitted. It was not until 1920 that funds were available to start the work in a really thoroughgoing way. The insect, in spite of our efforts of repression, has continued to spread. I have here a map showing the yearly spread of the insect. This small point [indicating] being the first year infestation, and this area the next, and so on. Our scouts last year found the insect on this outer zone [indicating] representing a territory in New Jersey and Pennsylvania of about 270 square miles. We have been unable to materially restrict its local spread although quarantine measures have been in force and operated as strictly as possible with the funds available. We believe the insects will continue gradually to spread, and our principal concern now is to stop, if possible, its long-distance movement. The infested area is largely devoted to the growing of truck crops and fruit for the Camden and Philadelphia markets. We have been inspecting a large amount of produce coming into Philadelphia, but we must change our plan of operation somewhat another year, and pay particular attention to the preferred host plants of the insect, especially sweet corn. These beetles are out and flying at about the time sweet corn begins to move to market. They like the silks of the ears of sweet corn and the bettles penetrate down into the tip of the ear. They are very hard to detect under those conditions, but we are constantly finding them in sweet corn shipped to Philadelphia, and also in shipments destined for long-distance movement. The Japanese beetle work is divided into several sections, as the scouting work to determine the outer border of the infested area, as a basis for quarantine lines, the actual quarantine work and work of inspection and certification, and research work or investigational features connected with the project.

This beetle is very susceptible to any foreign matter on its food plants. In fact, the usual arsenate of lead spray applied to a tree will cause the beetles to leave that tree; they will not eat the foliage. We have not yet found how we can kill this beetle by poisonous sprays; we are investigating various methods of poisoning it, but have not yet found anything that is very successful. In the grub stage the insect is destructive in certain types of grasslands, and especially in golf courses. We are also working on methods of controlling the insect if possible in the soil by the use of soil insecticides. We are conducting a variety of experiments and hope to succeed.

The large increase in the area covered by the insect last year has surprised us, and we urgently need more funds than we estimated for to adequately handle it. The increase in territory, as this circle enlarges is, of course, materially greater year by year. We will do the best we can by changing our methods of inspection and certification, although we can not adequately handle the territory on the basis we have heretofore with the funds available.

Mr. **Buchanan**. Tell us the extent of the damage and what the insect damages.

Dr. **Quaintance**. The beetle attacks foliage of various kinds; it especially likes grapes, cherry, apple, peach and shade trees of various sorts. It will defoliate fruit and shade trees.

Mr. **Buchanan**. You mentioned roasting ears. How does it hurt corn?

Dr. **Quaintance**. It does not damage corn seriously but it enters the tips of the ears and eats the silk, and some of the little kernels. The principal economic feature about the roasting ear is that it is shipped long distances and thus may carry the insect. We have always inspected sweet corn very carefully. In the heart of the infested territory the beetles occur literally by millions. One of our great concerns has been to keep automobiles, vehicles, and trucks going along thoroughfares through this area from distributing the insects. We have made many examinations of cars and trucks and find that the insects may be distributed in that way.

Mr. **Wason**. You mean the insect is picked up and carried along?

Dr. **Quaintance**. The beetle flies readily and if it strikes an object it will cling to it if it can. It has often been found on the clothing of people walking through the territory.

Mr. **Anderson**. Has it any natural enemies?

Dr. **Quaintance**. The insect, in Japan, has a number of natural enemies, and we now have two agents in Japan who are collecting parasites. We have had one large shipment of a predatory beetle come in already and we have shipments of other insects due to come in the spring. We feel that the ultimate control of this pest must probably come through the influence of these natural enemies, which we are getting from Japan.

Mr. **Buchanan**. I suppose you investigate these parasites to see that they will not damage anything else?

Dr. **Quaintance**. Yes, sir; we give that point very careful attention.

Mr. **Lee**. How do you distribute those parasites?

Dr. **Quaintance**. They are received at the laboratory at Riverton, N. J.; there they are bred in large quantities and then liberated at a given point. It appears that in the liberation of parasites the chances of their establishment are greatly enhanced if the number of parasites liberated at a given time is very large..

They have a much better chance of mating and finding their food, the Japanese beetle or related host, and thus establishing themselves. Our plan would be to breed up these parasites from Japan in very large numbers and liberate them at the best moment, giving them whatever encouragement we could. A good stock of these parasites would be maintained in the laboratory for use again if our first attempt at establishment failed. Through the cooperation of a New Zealand entomologist we have recently received a shipment of eggs of an important predatory enemy of white gouls in that country. This predator burrows in the ground, 2 or 3 inches deep, hunting gouls and other insects to feed upon. We believe it will be worth while to investigate for parasites in other regions of the world than Japan, and if our funds will permit we wish to send one of our agents in Japan to Korea, to India, and to China, where this type of beetle is very common. We believe the introduction of parasites is perhaps the best method by which to get control of this pest, and we are pushing the work as fast as we can.

One serious feature about our infestation is the large number of important nurseries within or nearly within the territory. We are devoting a good deal of time and effort to develop methods of freeing from the insect, if possible, nursery products, so that the nurseries will not be put out of business or sustain serious losses. There are nurseries in this territory of 300 acres in extent, and when they are infested certain classes of products, as evergreens, can only be sent to the region where the insect already occurs. This work has been directed to freezing the soil and thawing it quickly, to applying gases in vacuum to get better penetration of the soil, and along other lines. By these methods we hope to develop means which will reduce the losses of nurserymen to a minimum, but there will be considerable loss at best.

Mr. WASON. I understood you to say you do considerable inspecting. How is it possible to do inspecting if you do not allow it to be sent out?

Dr. QUAINTANCE. Our idea is to keep in close touch with the individual farms. If the beetles are there in numbers we require that the produce shall be placed where our inspectors can look it over. If the beetle is not known to occur on the farm, although the farm is in the general infested region, the inspection is more perfunctory.

Mr. WASON. Do you have enough men who are experts to perform this inspection work?

Dr. QUAINTANCE. We had operating during this year some 60 men for a month or two, but we will not have funds enough for men to cover the field properly another year.

Mr. WASON. Are those 60 men experts along that line?

Dr. QUAINTANCE. They are men we have trained. We employ college students, sophomores, juniors, and others who engage in this work during their summer vacations. They are trained and drilled by experienced men and work with these men before they go out by themselves.

FOR INVESTIGATION OF INSECTS AFFECTING CITRUS FRUITS.

In reference to the item on page 150, we have several laboratories devoted to the investigation of insects attacking citrus fruits and other subtropical fruits. The laboratory in Florida is devoted particularly to a study of the scale insects and the white flies, which are very destructive to the orange and grapefruit. This work has been under way for several years. We are constantly learning new things about these insects and there is a constant evolution or improvement in the treatments. We have new growers to instruct and new conditions to meet, and the work is highly appreciated. We have a laboratory at Miami, Fla., where attention is given to the insects injurious to mangoes and avacadoes the cultivation of which in that section is increasing rapidly. These fruits are coming more and more into favor, and there has already been planted in south Florida an important acreage in mangoes and avacadoes. These are plants of ancient origin; they have a number of insect enemies, some of which we have gotten from the West Indies or from Cuba, and certain native species have turned their attention to these plants. The information which we are getting in Florida is also of value for California, where they are also interested in avacado and mango culture. We have also maintained a southern California citrus insect laboratory, where the conditions of citrus culture are quite different from those obtaining in the southeast, due to one region being humid and the other arid, or nearly so. In Florida, certain fungous diseases attack citrus pests to a very valuable extent, and we are thus able to control these citrus pests by the use of rather weak sprays.

In California the benefit of fungous diseases is absent and stronger sprays would be necessary to control these insects, so the growers there have come to use hydrocyanic gas under tents. There has been a constant improvement of that method, and the bureau's work has resulted in a great deal of saving to the citrus industry of the State. We have, in cooperation with the Federal Horticultural Board, a small laboratory on the Canal Zone. This is a frontier point, and due to the large amount of traffic going through the canal it is desirable to discover possible introductions of and prevent their establishment in this country.

MEDITERRANEAN FRUIT FLY.

The Mediterranian fruit fly work in Hawaii is being continued. The parasites which have been introduced from India and elsewhere to destroy the fly are being encouraged, and are doing much good.

Mr. ANDERSON. Has the Mediterranean fruit fly established in California?

Dr. QUAINTANCE. No, sir. The Federal Horticultural Board and the State quarantine officers are very active in the inspection of produce coming from Hawaii, and fortunately the Mediterranean fruit fly has not become established in the State as yet.

CAMPHOR SCALE.

I would like to mention one new item under the subtropical insect head, and that is the camphor scale. In New Orleans last spring there was discovered a scale insect which was very destructive to camphor. Camphor becomes a large tree in that region and is a very popular shade tree. We do not know just when this scale insect was introduced, but it was discovered last spring. I have here a few pictures which will show the character of injury which it does. Here is a row of camphor trees which have been killed back. These other pictures show particularly the type of shade trees along the streets of New Orleans, indicating the difficulty of any spraying or control operations of pest of this kind.

The camphor scale is a very general feeder, and attacks many useful plants, as camphor, pecan, citrus, rose, rubber, deciduous fruits, figs, etc. It is one of the most omniverous insects we have ever had, after the San Jose scale. From all indications this insect will be very destructive to camphor, and certain other plants and it has appeared very desirable to try to hold it in check until we found out more about it.

The situation impressed the citizens and the city council of New Orleans to the extent that some twleve or fifteen thousand dollars were raised to be spent in control work by the Bureau of Entomology in cooperation with the State entomologist. At the recent special session of the State Legislature of Louisiana there was a substantial appropriation for insect control work, of which $18,000 was set aside for the camphor scale work. That is being spent under the cooperative direction of the Bureau of Entomology and the State entomologist of Louisiana. We estimated carefully the amount of money that the bureau would need to carry through its part of the program. We think we should certainly have $15,000 to carry out the work that the bureau wishes to do, especially research work. We know practically nothing about the insect, its life history, or its means of spreading.

We do not know nearly enough about its control to put this work on a scientific basis. If this amount is granted our plan will be to make a careful life history study of the pest, and carry on experiments in a fumigation and disinfection of nursery stock, and to start going such control operations in cooperation with the State and city as seen proper under the circumstances.

The insect can not be eradicated. It is found over probably two thirds of New Orleans. It occurs outside of the city some 8 or 10 miles, and is quite beyond any possibility of extermination. What we are aiming to do is to work out a scientific control for this pest, and to cooperate with the city and the State until we find that the local people can handle the situation themselves.

Mr. Anderson. Is this any relation to the camphor thrip?

Dr. Quaintance. No.

Mr. Wason. Is it destructive of the tree?

Dr. Quaintance. Yes; it works on the more tender shoots and branches. Fortunately the camphor tree can be cut back severely and a new growth will come out so that they will not lose their trees if these are properly sprayed.

Mr. Lee. Does it affect any other tree?

Dr. Quaintance. It occurs on many other trees, as the elm, the oak, etc. The live oak probably will not be damaged, but it occurs on practically all of the plants commonly used for shade purposes.

Mr. Anderson. It says in the note that it attacks the orange, lemon, grapefruit, Japanese persimmon, grape, peach, Japanese plum, pear, and fig, as well as many ornamental plants.

Dr. Quaintance. Yes, that is correct. It is a potential pest in the South, wherever the citrus and pecan industry are important. It is a serious pest of the camphor in New Orleans to-day

Mr. Anderson. What is the necessity for making this appropriation immediately available?

Dr. Quaintance. The State funds will have been expended in the course of another two months, and the city funds have been practically expended. The entire work will have to stop and our crews will be dismissed unless we get funds by the 1st of April to continue the work.

INSECTS AFFECTING CEREAL AND FORAGE CROPS.

Mr. Anderson. The next item we will take up is on page 144, for investigations of insects affecting cereal and forage crops, including a special investigation of the Hessian fly, grasshopper, and the chinch bug, for which your estimate is $175,000.

Dr. HOWARD. There is a reduction of $15,000 in that estimate under the appropriation for 1922. Last year Congress put in a proviso that not less than $40,000 should be used for investigating methods for the control and eradication of the grasshopper. We think that is too much this year, and we recommend that the amount be reduced by $15,000.

Mr. ANDERSON. Will you spend the entire amount during the current year?

Dr. HOWARD. Not quite all of it. The general work of that section is under the charge of Mr. Walton, who is here, and if the committee desires an explanation of the general work of that section, Mr. Walton will be glad to furnish it to you.

FOR ERADICATION OF GRASSHOPPERS.

Mr. ANDERSON. Mr. Walton, suppose you tell us what you did with the grasshoppers to begin with.

Mr. WALTON. We have located two field laboratories, one in North Dakota, where we have a man who has cooperated with the people throughout the States of North Dakota, Montana, Wyoming, and South Dakota, and has done some work in Minnesota, and who has been instrumental in inducing the farmers to use poison in combating this pest, and who has also acted in an advisory capacity with the State entomologists of those States. The saving has been very great.

Mr. ANDERSON. Were the grasshoppers particularly bad last year?

Mr. WALTON. They were bad in Montana and North Dakota. They will be exceedingly bad in eastern Montana next year unless the conditions change considerably.

Mr. ANDERSON. Have you any means of telling whether they are going to be bad?

Mr. WALTON. We are judging entirely by the number of eggs deposited in that territory during the past summer. There are a great many eggs there. That indicates rather certainly that serious trouble will occur there.

Mr. BUCHANAN. They may have had a migration of grasshoppers from other States.

Mr. WALTON. No, they have been breeding there for some years. They have had three dry years in Montana and that sort of weather is always favorable for grasshopper multiplication.

Dr. HOWARD. There are no longer any migration of grasshoppers as there used to be.

Mr. BUCHANAN. When you said they would be bad next year I thought probably there was a condition there something like we had. because after they came from Kansas down to Texas they destroyed everything the next year. There were so many of them that they darkened the sun.

Mr. ANDERSON. How do you attack them?

Mr. WALTON. Principally by means of distributing a mixture of wheat bran, arsenic and molasses, with some fruit flavor.

Mr. ANDERSON. You can not destroy the eggs?

Mr. WALTON. No. You have to get after the grasshopper shortly after he appears.

Mr. BUCHANAN. The effective remedies by way of poisoning the grasshoppers are well known.

Mr. WALTON. They are well known, but not generally adopted.

Mr. BUCHANAN. That is the fault of the people where the grasshoppers are.

Mr. WALTON. There is also the possibility of eliminating them by other means, and we are working on that now right along, to try to develop a cheaper and more effective means.

Mr. LEE. You used to run them into a ditch and burn them.

Mr. WALTON. That has been done, but it is rather difficult to carry out.

Mr. WASON. Are your activities confined to the States you mentioned?

Mr. WALTON. We have 14 field laboratories.

Mr. WASON. I am talking about the grasshoppers.

Mr. WALTON. We are doing work in Washington, Oregon, California, Arizona, and many other Western States where they have grasshopper outbreaks.

Mr. ANDERSON. Do you organize campaigns to induce the people to use the methods which you suggest?

Mr. WALTON. We induce the county agents to organize the campaign. We act in an advisory capacity with them. We do not do any real extension work.

INVESTIGATION OF HESSIAN FLY, ALFALFA WEEVIL, CHINCH BUG, ETC.

Mr. ANDERSON. I wish you would outline briefly the main lines of investigation under this item.

Mr. WALTON. The investigations carried on under this item have to do principally with insects affecting wheat, corn, rye, oats, and practically all forage crops. The principal insect enemies are the Hessian fly, the chinch bug, the grasshopper, the alfalfa weevil, and many others. One of the principle activities carried on under this is the Hessian fly investigation and survey. In this work we conduct experimental planting plots and are able to determine from these studies from year to year the safe date for planting wheat during a particular year. This is done not in any one State, but over great regions. This information is given both to the State entomological forces and by publication. In this way great savings are effected in the wheat crop every year.

Mr. LEE. How much leeway do you think you have? You have to plant it when you can, do you not?

Mr. WALTON. Yes, within reason. But it has been quite definitely determined that the safe time to plant winter wheat in order to escape the Hessian fly, is, generally speaking, the best time for planting in order to obtain maximum yields.

Mr. ANDERSON. How does the Hessian fly operate?

Mr. WALTON. It lays its eggs in the leaves of the wheat, and the maggots work down the inside of the sheath and cut off the flow of nutriment from the root of the plant. Then the plant dies or falls over at harvest time, thus making it impossible to harvest the grain. There was a loss of $16,000,000 from the ravages of this pest in Kansas in one year.

Mr. **Anderson**. The only way to control it is by planting at the proper time, so that the insects will not attack it.

Mr. **Walton**. That is the only way to control it. In addition to this we have the alfalfa weevil investigation, with the center at Salt Lake City, and we have originated a means of control which is eminently satisfactory. Our men are now engaged in experimenting with a dusting method which will probably cheapen the means of control.

We have brought in large numbers of parasites for this insect. One of our assistants has been sent to France recently for the purpose of continuing this work. In time we hope perhaps to be able to achieve biological control in that way.

Mr. **Anderson**. How extensive are the infestations of the alfalfa weevil?

Mr. **Walton**. No careful survey of the alfalfa weevil distribution has been possible for some years, because of insufficient funds. But we know it occurs over a large part of Idaho, in southeastern Oregon, throughout the State of Nevada wherever any alfalfa is grown, in Utah, western Colorado, and southwestern Wyoming. It has spread gradually from year to year. Eventually it will probably become destructive throughout the entire alfalfa-growing region throughout the West, and perhaps in the eastern part of the country.

Mr. **Anderson**. Is it very destructive?

Mr. **Walton**. Quite so; however, the present means of control by spraying is very efficient. It consists of applying arsenate of lead at a time when the larvæ or maggots are most abundant. They devour the alfalfa leaves, but if this one spraying is properly done it gives complete control of the insect for the entire season. The remainder of the cuttings are free from the insect. It costs about $1 an acre.

Mr. **Anderson**. There have not been any large infestations of chinch bugs in the last year, have there?

Mr. **Walton**. Not in the last year; we have had some small outbreaks.

Mr. **Anderson**. The means of control have been pretty well established?

Mr. **Walton**. The means of control have been very well established, although we have a new insecticide which seems to be useful in some cases. It consists of a soap and oil mixture.

INSECTS AFFECTING SOUTHERN FIELD CROPS.

Mr. **Anderson**. Your next item on page 145, is for investigations of insects among southern field crops, including insects affecting cotton, tobacco, rice, sugar cane, etc., the cigarette beetle, and the Argentine ant. For this item your estimate for 1923 is the same as for 1922, $165,000.

Dr. **Howard**. The appropriation of $165,000 for 1922 is not increased in our estimates at all. Under that fund we propose to expend about $112,000 on cotton insects, about $14,000 on sugar-cane insects, and about $24,000 on tobacco insects.

COTTON-BOLL WEEVIL.

The principle work in connection with cotton insects is on the boll weevil. We have a central laboratory at Tallulah, La., under the charge of Mr. B. R. Coad, who, a few years ago, developed a method of dusting at night with an arsenical mixture known as arsenate of lime. He perfected this method under the conditions which exist in the bottom lands of Mississippi and Louisiana and adjoining territory to such an extent that a number of cotton planters became quite enthusiastic because they were able to make large savings.

Mr. **Anderson**. Has it been adopted?

Dr. **Howard**. It has been adopted quite extensively, with varying success. Machinery is being developed; private enterprise is going into the development of machinery, and a man is also employed who is an expert mechanical engineer.

Last year we used quite a large sum of money in the establishment of laboratories for experimental field demonstrations under differing conditions than those that exist in the bottom lands of the Mississippi. We found there variations in the way that this thing was to be applied and the quantities that were to be applied, under differing conditions in different parts of the cotton belt. Conditions in Texas are quite different from those in the bottom lands. Conditions in Georgia and Florida vary from conditions in North Carolina. So we established last year 10 stations, 9 beside the station at Tallulah, where demonstrations are going on under the supervision of experts to prove to the people in those regions that it can be done, and in order to determine the exact variations in the process that are necessary. A great many people went into this dusting without knowing the best ways of doing it, and made failures of it, but those who went into it under proper auspices got good results, and made large savings.

Mr. **Lee**. But it is too expensive for a little farm.

Dr. **Howard**. The little farmer can save a good deal by the use of that method. We had one station in North Carolina, two in Georgia, and three in Texas.

Mr. **Lee**. Where were the stations in Georgia?

Dr. **Howard**. We had one at Waynesboro and one at Americus last year. We are going to change the location of those stations next year. We have not determined yet upon the exact points where they will be placed next year, but it seems desirable as soon as possible to get this money which we know will produce a very considerable saving if the method is thoroughly understood and adopted by the cotton planters. Some of the manufacturers of arsenate of lime have done some harm by sending out salesmen who do not understand the process, and who painted too rosy a picture, with the result that many people who tried the method did not get the results they would have got under other circumstances.

Mr. **Lee**. Can you tell me what the average cost is per acre?

Mr. **Webb**. It is something like seven or eight dollars per acre.

Mr. **Lee**. For how many dustings?

Mr. **Webb**. For four applications.

Mr. **Buchanan**. That is a prohibitive cost for the ordinary cotton grower. Only people growing cotton on the very richest ground could afford it.

Dr. **Howard**. We are trying to reduce the cost in every possible way by making the machinery less expensive for application and by reducing the number of dustings, and so on.

Mr. **Buchanan**. The ordinary cotton crop does not average over a quarter of a bale an acre.

Dr. **Howard**. In such regions as that it is true that the cost would be prohibitive.

Mr. **Buchanan**. Of course, in very rich land, where they make a bale per acre, it would pay.

Mr. **Lee**. Unless we find something effective it does not pay to plant it at all in my country. There is no use planting it and running a boarding house for the boll weevil.

TRAVELING EXPENSES.

Mr. **Anderson**. Your detailed statement under this item shows an increase of $20,000 for traveling expenses. What is the reason for that?

Dr. **Howard**. We are training a number of men at Tallulah and are sending them out through the South. They are doing a great deal of lecturing. We have an admirable extension man stationed at Tallulah. He trains a number of graduates from southern colleges who are familiar with the cultural methods of the South. They are being trained in this propaganda, and those men are being sent wherever there are public meetings and they are called upon to explain the latest results in this experimental work.

Mr. **Anderson**. Are they employees of your bureau?

Dr. **Howard**. They are.

Mr. **Webb**. I might say also in connection with these different stations mentioned by Dr. Howard that last year was the first year we had those, and this is the first year that the expenses have appeared for those different stations.

Mr. **Anderson**. You are estimating for $20,000 more than you had in your appropriation last year for traveling expenses.

Dr. **Ball**. That is partly on sugar-cane investigations.

Mr. **Anderson**. In your detailed statement of expenditures under this item, there is an increase in traveling expenses and in practically all the items. There is an increase of $5,000 on the tobacco insect.

Mr. **Webb**. We have more work, and it is necessary to do more traveling to get these things where they are applicable. We have got to get them to the States in some way.

Mr. **Anderson**. Here is an item in reference to the sugar-cane insect in which there is an increase of $9,000 in traveling expenses, and you expend only $12,000 in salaries in connection with that item.

Dr. **Howard**. There is something wrong about that. We have only allotted about $14,000 for sugar-cane insects.

Mr. **Webb**. The allotment should be something over $14,000 instead of $25,000. Those figures are wrong.

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Dr. **Howard**. Mr. Chairman, when we adjourned, we were on the item of southern field crops and you brought up the question of our traveling expenses, and after the conclusion of the hearing I asked Mr. Webb to go back to the department and investigate that matter. I knew there was a mistake of some kind. Mr. Webb will give you the result of his findings.

Mr. Webb. That was owing to a clerical error. That $50,000 ought to be $40,000 for the year 1923 and in this typewritten book here you will find under sugar cane at the bottom, $10,400 for traveling. That should be $1,400 and the other $9,000 should go up under cotton, under the item of equipment and material, making that $13,000 under cotton for equipment and material.

Mr. Anderson. I take it that that has particularly to do, then, with the investigation of machinery and the purchase of material with respect to the calcium arsenate project?

Mr. Webb. Yes.

Mr. Anderson. That still leaves you with an increase of $10,000 for traveling expneses in this item.

Mr. Webb. That is only apparent, for the reason that last year, you will notice, there was $21,350 that was immediately available and was spent in the other fiscal year before the 1st of July.

This increase in travel is simply an increase in proportion to the amount that was spent under that provision making the appropriation immediately available.

INSECTS AFFECTING FORESTS.

Mr. Anderson. We will next take up the item on page 146, "For investigations of insects affecting forests."

Dr. Howard. There is an increase of $5,000 recommended here, Mr. Anderson, which we wish to add to the money we have been spending for the investigation of methods for preventing losses of forest products through wood boring insects. There is a very large loss of structural timbers from white ants. There is a large loss of stored timbers from what are known as the powder post beetles, and a group of insects of that general nature and while we have been spending a good deal of money successfully in that investigation, we would like to spend more. There is a very considerable demand for it. We found that service was of great use during the war on account of the damage to ditching implements, shovel handles, and everything of that kind. When stored in bulk, they were attacked by these powder post beetles which injure only dried wood.

Mr. Anderson. This is not a forest insect then?

Dr. Howard. It is an enemy insect to forest products.

Mr. Anderson. But it does not attack the trees?

Dr. Howard. It does not attack the trees themselves, only the timbers after they are stored and dried; but, of course, under that heading, come the white ants which are doing a great deal of damage to stored timbers and to telegraph poles and to railroad ties and things of that kind. That is the reason for this suggested increase.

Mr. Anderson. My recollection is there was a small increase in this item last year.

Dr. Howard. There was an increase, I think, of $15,000; at all events, the sum appropriated was $55,000, provided, "that $15,000 shall be used for preventing and combating infestations of insects injurious to forest trees on and near the national forests, independently or in cooperation, and so forth." That work went on very successfully, indeed, especially in Oregon and Washington.

Mr. Anderson. My recollection is we have just provided a deficiency of $150,000 for Washington, Oregon, and California.

Dr. **Howard**. Yes, sir; that appropriation was made as a deficiency appropriation last year. In the meantime this $15,000 was spent in reconnaisance work and surveying the forests out there. It appears there is a threatened epidemic of bark-boring beetles which may cause an enormous damage to the forests on the Klamath Indian Reservation, and extending out into Oregon and northern California and also in southern Washington. We have marked the trees that should be felled and have made arrangements for this campaign which will be undertaken beginning next April under this appropriation of $150,000. That $150,000 will not all be used this spring. It will be divided between the Forest Service and the Bureau of Entomology and a portion of it allotted to the Indian Service. It is all appropriated to be expended under the direction of the Secretary of Agriculture, and he is making these allotments at the present time. The camps are being started or arranged for, and work will begin in April, the critical time of the year, but it can only continue for two months at the utmost. At the end of that time all the work that can be done this year will be done. The balance of that $150,000 will be spent at the corresponding time next year.

Mr. **Anderson**. I understand that, and what I am getting at is whether there is any necessity for keeping this $15,000 appropriation in view of the fact that you have this $150,000.

Dr. **Howard**. By all means, and not only that, but we want more. We have not been able to ask for more on account of the condition of the public funds. This set of experienced men are needed all the time for survey work in the forests to spot these threatened outbreaks of this beetle.

Mr. **Anderson**. Then, as I understand it, the distinction is that the $150,000 deficiency is for the actual eradication work.

Dr. **Howard**. That is absolutely so.

Mr. **Anderson**. While this $15,000 covers the preliminary scouting and spotting work, which requires, I take it, the services of experienced men.

Dr. **Howard**. Quite so. You have it exactly, sir.

Mr. **Anderson**. As I understand it, this $5,000 increase is an increase of the item provided for in the proviso.

Dr. **Howard**. No; it is an increase of the total amount of $55,000.

Mr. **Anderson**. But if it is to be used as a part of the work covered by the proviso, the amount named in the proviso ought to be increased.

Dr. **Howard**. It is not for that work at all. It is for forest products work.

Mr. **Anderson**. Your statement here shows that it is. On page 108 of this detailed statement this increase appears in the item for cooperative forest insect control.

Dr. **Howard**. It should not appear there. It should appear as an entirely independent investigation of forest products, wood-boring insects, etc. I am sorry there is a mistake there.

Mr. **Anderson**. Does this additional $5,000 have to do with laboratory experiments?

Dr. **Howard**. Partly, and partly, also, to employ experts who can be sent when damage is resulting or threatened to see what can be done. We frequently have serious damage to Government-owned buildings through termites, and we have a man in our service who is frequently called upon For example, in the Bureau of Engraving and Printing they have serious damage to stored papers resulting from infested timbers in the construction of the building, and we have had to send a man over there to consult with them and tell them what to do, and he is conducting experiments at the same time to see if he can cheapen his recommendations. In the same way, the same man has been sent to Government-owned buildings elsewhere in different parts of the country.

Mr. **Anderson**. Then this is an increase in your general item for investigation of insects affecting forests and forest products.

Dr. **Howard**. Yes.

INSECTS AFFECTING TRUCK CROPS.

Mr. **Anderson**. The next item on page 147 is "for investigations of insects affecting truck crops, including insects affecting the potato, sugar beet, and so forth."

Dr. **Howard**. There is no increase here at all, sir. You are familiar with the work that has been done under this item. The most interesting item under this heading, aside from the bean beetle, which is a supplementary appropriation later, is the work on the sweet-potato weevil which has been going on.

Mr. **Anderson**. That is a storage-product insect?

Dr. **Howard**. No; not entirely. It affects the potatoes in the field. I have here Mr. Popenoe and Mr. Graf, both of whom are engaged in that investigation, and if you wish to ask any specific questions, they can answer them better that I can.

Mr. **Anderson**. I should like to know in a general way the character of the work being done under this paragraph.

Mr. **Popenoe**. The general work under truck-crop insect investigations?

Mr. **Anderson**. Yes.

Mr. **Popenoe**. In California we are studying the application of nicotine dusts. That is a new method of applying contact insecticides in such a way that they operate to remove much of the difficulty incident to the carrying of water for considerable distances.

It is often necessary for the grower to carry water for two or three miles in order to reach the field, and this method is making the application of insecticides possible where it otherwise could not for this reason be put to use.

Mr. **Anderson**. Is this a dry spray?

Mr. **Popenoe**. It is a dry spray and makes necessary only the carrying of the dust itself, the actual insecticide, with a small dilution, and there is a material saving in cost of application through the operation.

Dr. **Howard**. Tell them what it is diluted with.

Mr. **Popenoe**. It is diluted with finely ground pipe clay or kaolin and lime, and free nicotine is given off.

Mr. **Anderson**. Does it stick on the trees?

Mr. **Popenoe**. Yes; it adheres very well to the leaves of the plant and it produces a cloud of free nicotine which kills the insects almost immediately. It has served to control insects that we have had much difficulty heretofore in controlling.

Mr. ANDERSON. Tell us something about what is being done in the matter of stored products insects.

Dr. HOWARD. That comes under another head. We have asked to divide the two items.

Mr. ANDERSON. Is there anything else under this item?

Mr. POPENOE. We are conducting cooperative experiments in California with the sugar-beet disease known as the curlytop. This is serious throughout the Mountain and Pacific States and is transmitted solely by an insect, so far as our experiments show. It has been the cause of very material losses, from 50 to 75 per cent of the crop in many cases. We are rearing in cooperation with the Bureau of Plant Industry a resistant beet from specimens which do not take the curlytop disease even though carefully inoculated, and our experiments are now covering a very considerable range of beet-seed stock. We believe we will make possible the profitable growing of beets even in the curlytop territory. We are also undertaking studies of insects affecting small fruits and general truck insects; that is, miscellaneous insects affecting garden vegetables of all types. Our work on the potato is materially less inclusive than the value of the crop warrants on account of the necessity for our funds being expended for the purposes specifically directed by Congress. There has been in the past a very interesting line of work in connection with the mosaic disease of cucurbit, which has caused great loss to the pickle industry in the North. That has been found to be spread almost entirely by insects, the striped cucumber beetle and the melon aphis being particularly harmful.

Mr. ANDERSON. How is that being controlled?

Mr. POPENOE. It is being controlled by the application of nicotine dust, one of the most effective remedies we have so far developed. We find we can destroy both the melon aphis and the striped cucumber beetle by the same treatment. There is also the tipburn or hopperburn of potatoes which has caused material losses and which is being controlled by the application of Bordeaux mixture. It seems to act as a deterrent against the live hoppers and also stimulates the potatoes to grow away from the disease.

Dr. HOWARD. They are finding that very many of these plant diseases are carried by insects. If we control the insects, we control the disease. It is just the same as it is with human beings.

INSECTS AFFECTING STORED GRAIN, CEREALS, ETC., AND THE HOUSEHOLD.

Mr. ANDERSON. We will take up the next item on page 148, "For investigations of insects affecting stored grain, cereals, and other food products, and the household."

Dr. HOWARD. This item has heretofore been included with the truck-crop item. It is such a distinct line of investigation, comprising insects of an entirely different character, that we have had to separate it and put it under an expert, with a corps of assistants, and we would like to establish a differentiation between the two appropriations. Under this line of work they are taking up such things as the grain weevils. We have a laboratory at Orlando, Fla., for the study of corn weevils and investigations regarding the bean and pea weevils, the peanut insects, insects affecting hides in storage, insects affecting stored meats and insects affecting stored wool are all going on at the same time. We are investigating different methods of fumigating stored products attacked by these insects. We are studying their life history so as to know the right time to fumigate, and I think there is hardly any branch of the bureau that has had better results than this one. The owners of storage warehouses and mills and so on are constantly appealing to us for advice, and there has been a great deal of traveling, in addition to a great deal of laboratory investigations. It is a very important line of work.

Mr. **Anderson**. Do any of these concerns employ entomologists themselves?

Dr. **Howard**. No; not so far as I know. I do not know of a single case where any of these commercial organizations employ an entomologist.

Mr. **Anderson**. Where they have such difficulties they have to come to you or else go to their State organization.

Dr. **Howard**. If they find their State organization is not able to handle the matter, they apply to us.

Mr. **Anderson**. What is the necessity for adding the words "and the household" to this appropriation?

Dr. **Howard**. Because household insects have to be studied and we have to give advice on household insects, and we wish to assign them to a certain man, and therefore wish to put them under this section, because they come closest to stored products.

Mr. **Anderson**. It seems to me that you are getting somewhat outside of your bailiwick in reference to some of these things under language as broad as this.

Dr. **Howard**. How does that appeal to you? Where would you put it? Naturally, we must study them. They are hardly agriculture, of course, if that is your idea.

Mr. **Anderson**. I do not know, but it just seems to me that the language as it is written is much broader than is necessary in order to do what I assume you want to do.

Dr. **Howard**. This is the only insect-fighting organization under the Government.

Mr. **Anderson**. I suppose this would include ants and flies and insects affecting human beings as well as insects affecting food products?

Dr. **Howard**. Yes; we have a separate heading for insects affecting domestic animals and the health of human beings.

Mr. **Anderson**. Does the Public Health Service do any work in reference to insects affecting human beings?

Dr. **Howard**. It does what it can, but they have no expert entomologists in the Public Health Service. Of course they go into the question of the insects that actually carry diseases, such as malaria, yellow fever, and so on, but they are studying the question from the disease-control point of view and they are not expert on the insect side. I, myself, hold the honorary position of consulting entomologist in the Public Health Service, and they are appealing to me for advice all the while, and we can conduct to better advantage, it seems to me, in the Bureau of Entomology than they could in the Public Health Service investigations on biology, the life history of these different insects that carry diseases, because we know insects so well, and the whole object of our official existence is to destroy insects, and therefore we know the economic side better than any other organization which might wish to take it on.

Mr. **Anderson**. I think it is entirely proper to keep the insect work in one bureau, and I am in entire sympathy with doing that, and the only thing I want to be certain about is that it is in one bureau, and once it is there it is not going to be started somewhere else.

Dr. **Howard**. Exactly. There has been no effort to do anything in any other branch of the Government that impinges on our ultimate authority in insect matters. They study such questions as the control of malaria or the destruction of mosquitoes, in a broad way. They do that sort of work.

HOUSEHOLD INSECTS.

Mr. **Anderson**. Let me ask you whether you have any projects now that involve the study of household insects.

Dr. **Howard**. We are studying mosquitoes from the economic point of view in the conduct of a plantation in the South, its effect through malaria on the labor of the plantation, and the best ways of controlling the mosquitoes. We have a large project of that kind with headquarters at Mound, La. We have been considering the house-fly question a very long time, but that hangs up with agriculture in that we are studying the effect of food contamination by the house fly in the great packing establishments and so on; in fact, our work on the house fly is standard. It is known everywhere. They appeal to us always on house-fly questions, and the question of the care of the manure pile and all that sort of thing attaches these investigations to agriculture; the presence of flies in dairies and how to keep them out, to avoid the contamination of food supplies, which are very largely agricultural supplies.

I am glad to hear you say you think the insect work should be concentrated. I think it is. The Public Health Service appeal to us, as I say, about strictly entomological matters. I do not think there is any duplication of work. The medical departments of the Navy and the Army also appeal to us about matters relating to insects affecting health.

Mr. **Anderson**. You are about through with the fly and the mosquito, are you not?

Dr. **Howard**. Oh, no. We have just found out some very interesting things about the house fly. We have found out how far it can travel, what the possibilities are of food contamination at considerable distances from breeding centers. That has been done through observations made at Dallas, Tex.

Mr. **Lee**. It seems to me the most important thing to know about the house fly would be to know how to kill him and get rid of him.

Dr. **Howard**. Yes; that is true. We have insisted upon the necessity of preventing the breeding of flies; to attack them at their breeding places. These "swat the fly" campaigns do not amount to a row of pins comparatively. You can kill 100,000 or 1,000,000 flies, but if you do not stop the breeding places you are going to have another swarm right away. As to mosquitoes, you said, "the mosquito," there are over 100 different species of mosquitoes in this country, and they have the most diverse breeding habits. There is room for a great deal of study still on what you call the mosquito.

Mr. **Anderson.** I suppose I am in the same position as a lot of other people, to me a mosquito is a mosquito, just like to a man who raises crops wheat is wheat, but to the plant breeder there are various kinds of wheat.

Dr. **Howard.** Exactly.

BEE CULTURE.

Mr. **Anderson.** We will take up the next item:

For investigations and demonstrations in bee culture.

Dr. **Howard.** There is no increase here, but Dr. Phillips can tell you what we are doing.

Mr. **Anderson.** Yes; I would like to know what we are getting for our money.

Mr. **Phillips.** Mr. Chairman, our office has the distinction of being the only one in the bureau that is not trying to kill some insect. On the other hand, we are trying to propagate ours as rapidly as is economically practicable.. The work is undergoing certain necessary changes because of the changes which occurred in bee culture during the period of the war. During that time we devoted our attention almost exclusively to increasing the honey production of the United States because of the sugar shortage, and during that period the honey production of the country was increased at least double what it had been, but the increase took place in a rather peculiar manner, and a rather gratifying one, in that the increased production was almost always in the hands of men who are specializing in beekeeping.

Our effort has been throughout our entire work to create specialists in this line because of the difficulties incident to amateur bee culture. The drop in prices which came to honey, like it did to other farm products, has placed a peculiar burden on our office, in that if we are to save the industry as it now stands, we must, among other solutions of the difficulty, make it possible for the bee keepers to produce larger crops per colony and in that way decrease the cost of production. We also found during the period of the war, when we did not have time to investigate them, that there were certain peculiar methods of management necessary under different conditions in different parts of the country, and we have been for the last year and a half working out the methods most applicable to certain honey sources. We have prepared three bulletins which are now in the press, or almost off the press, on that subject.

EUROPEAN FOULBROOD.

We also discovered during that period a rather remarkable thing. One of the bee diseases which has been exceedingly troublesome, is one which is directly correlated with the time of the honey flow, and we have found that this disease occurs only under conditions where the honey flow comes more than three months after brood rearing begins in the spring. That ties directly up with the management which we are outlining for the different sections of the country, and for this particular disease, the methods of management which we are advocating are cared for by preventive measures rather than by remedial measures.

Mr. Anderson. What is this disease?

Mr. Phillips. This disease, European foulbrood, is an infectious disease caused by a specific bacterium, which has caused very large losses in the country. The cause of the disease was worked out in the bureau and remedial measures also have been for some time worked out. The effort being made in this case is to show how the disease may be prevented before its occurrence, which, of course, is a very large step in advance. During the war, as I said, we devoted our attention very largely to increasing the honey crop and of course we did that through the established extension channels. We had during the war a considerable number of field men who went about the country holding meetings through the regular extension methods in order to increase the honey crop.

Mr. Anderson. Let me ask you right there, is the large proportion of the honey raised by people who specialize in producing it, or is it raised as a side issue.

Mr. Phillips. The largest proportion of the honey crop of the country is produced almost exclusively by specialists. The problems are a little too complicated for side-line work, and the increase in the number of specialists has been most pronounced in the Western States, but is rapidly taking place in the Eastern States, a highly gratifying situation, because of the prevalence of these brood diseases which I have just mentioned, which are excedingly difficult to control when there are so many people engaged in the business. The point I wanted to make was that during the war it was necessary for us to have a large number of extension specialists for the production of a large honey crop. We are now decreasing our efforts along that line, but I would like to emphasize the fact that there has been no decrease in the effort as a whole, in that wherever we drop out of a State the States have found the work so necessary that they are all going ahead with it. That is making it possible for us to devote our attention more largely now or almost exclusively to the working out of these peculiar problems of an original nature which I have mentioned, and then, of course, we are almost in as close touch with these extension men as we were when they were actually employed in part or entirely by our bureau.

BEEKEEPING—PRODUCTION OF HONEY.

The other lines of work which we are undertaking have to do with some of the broader problems in beekeeping. We find that some of the most difficult problems for a beekeeper, specialist or amateur, is to have his colonies up to maximum strength at the beginning of the nectar secretion from the different plants, and in so many parts of the country, particularly in the southern parts of the country, these periods of nectar secretion come exceedingly early. If I may take an example right here in the vicinity of Washington, our greatest nectar secretion comes from the tulip tree, which blooms usually about the first week in May. The average beekeeper gets his bees up to maximum strength about the first week in June, and is a month too late. We have found that by using certain methods we can increase the population of the colony very rapidly in the spring so that the tulip tree is capable of producing an average crop of 100 pounds per colony per year, and without that method, it produces no crop per colony per year, and all the beekeeper gets if he fails to get the tulip tree is a little from the clover and some of the fall flowers. I use that as an example of the methods which we are working out for the different flower regions of the country.

Mr. **Anderson**. Is the production largely from flowers that grow normally in the region or do some of these people that specialize in beekeeping plant crops especially for this purpose?

Mr. **Phillips**. It is not profitable to plant any plants for nectar alone. Many plants, of course, which secrete an abundance of nectar are propagated because of other economic value, such as alsike clover, buckwheat, alfalfa, and other plants which have value from other points of view, and of which the beekeeper takes advantage, but it is not profitable, certainly with the present cost of labor in this country, to grow any crop for nectar alone. That makes it, of course, more necessary than ever that the beekeeper should know the proper measures for taking advantage of what it is in his locality rather than to create the plant conditions himself. I may say that the reason why so many of our honey plants come early in the spring is because the temperature conditions, either early in the spring or late in the fall, are best for the production of sugar in the flowers, and consequently best for nectar secretion, and we do not have the opportunity of working our bees all summer, because during the heat of the summer there is practically no nectar secretion.

Mr. **Lee**. How do you increase the number of bees in a hive from fall, we will say, to spring.

Mr. **Phillips**. There are several things which we do, one of which is the replacing of our queens in every colony every year. We find that the queen bee can lay vastly more eggs during the first year of her life than at any other time, so we re-queen every year. We are also finding that it is absolutely necessary to leave a larger amount of honey in the hive than the average beekeeper leaves, so that if there are periods during the spring when nectar is not coming to the hive, there will be something there for them to draw on; and we are also finding it necessary to protect our bees more than the beekeepers have in the past. We learned that point in connection with our winter investigations which have been carried on for a number of years and which have now practically been closed. That is, we have been able practically to close out that problem, but it is now running right along, and the same line of work is going right over into the spring of the year, and the necessity for protection is as great or greater during the first two months of brood rearing in the spring as it is in the wintertime.

Mr. **Lee**. What is the average production of honey in the United States?

Mr. **Phillips**. The average production is not more than 15 pounds per colony.

Mr. **Lee**. What is the total?

Mr. **Phillips**. The total production is now in the neighborhood of 300,000,000 to 350,000,000 pounds.

Mr. **Anderson**. Is beekeeping carried on by orchardists in connection with orchard operations at all?

Mr. **Phillips**. They are finding, of course, that the honey bee is exceedingly valuable for cross pollination purposes. They are also finding that it is very much better to hire some skilled beekeeper to bring his bees to the orchard than it is to attempt to take care of them for that purpose alone, and in very many parts of the country the horticulturists make contracts with beekeepers to bring in their bees for the period of the year when they are useful there, because a skilled beekeeper can bring in larger colonies. He can bring in thousands and thousands of bees whereas the fruit grower, unless he was a skilled beekeeper at the same time, would have colonies at that time which would be very much less effective for the purpose.

Mr. **Anderson**. Can they be brought in and moved around without any difficulty?

Mr. **Phillips**. Oh, yes; we move bees from place to place with considerable freedom. The Ford machine is the thing which has made beekeeping in that way profitable. They needed cheap transportation. Our beekeepers now are finding it quite desirable, after they have developed colony strength in the spring to a high degree for a certain crop, when that source of nectar is over, to put their bees on to a truck and move 50 to 75 miles to start the bees to work on some other flower source. This thing which we call migratory beekeeping has developed to a large degree in California, and is increasing very rapidly in other parts of the country.

Mr. **Magee**. That is a very interesting proposition and I would like to ask just what work the bee does in the orchard and what is the result of that work.

Mr. **Phillips**. The bee is instrumental in carrying pollen from one flower to another flower. I do not know whether I ought to discuss a plant industry problem or not, Mr. Chairman. Many varieties of domesticated fruits are incapable of developing fruit pollinated with pollen from the same plant, and in many cases they are incapable of producing fruit when pollinated with pollen of the same variety. Consequently, the honey bee is exceedingly valuable in carrying pollen from, we will say, one variety of apple to another variety of apple, causing a larger setting of fruit, a more nearly perfect fruit, a better flavored fruit, etc. I may say that I fully believe that the honey bee does more for American agriculture by its ability to cross-pollinate in this way than it does in its honey crop.

Mr. **Anderson**. The next item is on page 150, in reference to citrous fruits.

Dr. **Howard**. We heard Dr. Quaintance on that subject yesterday afternoon.

INVESTIGATION AND CLASSIFICATION OF MISCELLANEOUS INSECTS, ETC.

Mr. **Anderson**. The next item is on page 151:

> For investigations, identification, and systematic classification of miscellaneous insects, etc.

Dr. **Howard**. The words "household insects" should go out there because it is included under the stored-products item.

This appropriation, Mr. Chairman, is divided, and we are now spending, under the head of identification and classification, $27,080, and on the project in reference to insects affecting the health of man, which is the mosqutio work at Mound, La., of which I spoke a few moments ago, we are spending $12,500, and for the insects that attack animals, $12,750 plus $10,000, which was added to the appropriation last year for investigation of the screw worm and blowfly in the southwest. That makes the total of $62,330. I explained to your committee last year the importance of this largest item of $27,080 for the identification and systematic classification of miscellaneous insects. Do you wish to go into that matter again?

Mr. ANDERSON. As I understand it, this is fundamental work which concerns the entire proceedings under this item.

Dr. HOWARD. Quite so. We have a number of the best specialists in the world connected with the bureau, and they tell us what the insect is in every case, and we are appealed to by all the agricultural colleges and experiment stations all over the country for information of this character, and it seems necessary for us to have this information.

SCREW WORM.

Mr. ANDERSON. Suppose we take up the screw worm proposition and have you tell us what you have been doing on that.

Dr. HOWARD. Can Mr. Webb tell us about that?

Mr. WEBB. The adult of the screw worm is one of the blowflies. It is especially bad in Texas and runs up into Kansas and over quite an extended territory and is especially bad on cattle. It attacks any wound in cattle. Sometimes when cows are dropping their calves the flies are attracted by the flow of blood. Any flow of blood will attract the fly, and the resulting maggots bore into the flesh and in a great many cases kill both cow and calf. Any wound of that kind will attract them. They breed in immense numbers. They also breed in dead carcasses. A dead cow will breed millions of these flies. We have been handling the proposition by advocating the burning of carcasses, as much as we can; treating carcasses with chemicals to render them unfit for the breeding of the maggots and systematic trapping of the adult fly itself over the ranches. Those are the main points we have been working on.

Mr. ANDERSON. Can you get the ranchmen and the farmers sufficiently interested to take preventive measures of that sort?

Mr. WEBB. It is a hard matter. It requires education and you have to work on them for some little time to get them to do it; but you find them very much interested in it when they see that it pays. There is one phase of the problem that it is hard to get them to do and that is in connection with range management; such as the management of the bulls so that the large proportion of calves born will be born at a time when the fly is not prevalent, because if the flies are there, most of those calves are going to get the screw worm, but by proper management in keeping the bulls under control so that the calves will be born at the proper time we do not have that trouble. The average ranchman thinks he knows all about ranching and that we can not tell him anything until we have shown him to the contrary. In the few cases where they have allowed us to make a test, they have been very glad to put it into operation, and, of course, we are also developing medicines to use where we find actual infestation of wounds, to kill the worms already in the cattle. One of the things that we especially want to do is to use some large ranch to put into operation all of these recommendations we have in reference to range management, the burning of the carcasses, the treatment of some of the carcasses with chemicals to see which is best, either burning or treating with chemicals, and the trapping of the flies themselves. Of course, there is a great deal to be done in further development all along those lines.

Mr. ANDERSON. I think, Dr. Howard, you said you had found out how far these flies fly?

Dr. HOWARD. I was referring to the house fly.

Mr. WEBB. We have records on these flies, too. They will fly 17 miles. We had very elaborate tests on that at Dallas, Tex.

Mr. ANDERSON. In order to make the test of the sort you suggest valuable at all, the ranches would have to be pretty well isolated, would they not; otherwise you would get infestation from other places?

Mr. WEBB. Yes; to some extent that is true.

Dr. HOWARD. You would, in order to secure perfect results, but if we can show a great decrease on a single, large plantation, that would be a field demonstration of laboratory methods which would induce the neighbors of that man to go into it.

Mr. ANDERSON. Are these infestations severe and is this fly capable of doing a great deal of damage?

Mr. WEBB. Congressman Hudspeth, who is a ranchman himself down there, tells me that the loss is at least $1,000,000 per annum.

Mr. ANDERSON. It actually causes the death of the animal?

Mr. WEBB. Yes, sir.

OX WARBLE.

Dr. HOWARD. I should like Mr. Webb to also tell you about the ox-warble work, which comes under the $12,000 laid aside for this work.

Mr. WEBB. The ox warble works in a little different way. The adult is also a fly which lays its eggs just above the hoof of the animal. It will attack a perfectly healthy animal. It does not attack sick animals any more than any others. It places the egg on the leg just above the hoof, usually on the hind leg. The egg hatching the little maggot bores directly into the leg up under the skin into the body and goes into the gullet and remains there for a little while, going through some changes, and eventually works out somewhere along the backbone under the skin, where it stays for some time and continues to grow. The visible results are several large lumps along the back on either side of the backbone, which we call sometimes "warbles" and sometimes "wolves." That is the way we tell whether a cow is infested or not. All of that migration through the body of the cow and the living under the skin there causes considerable depletion of vitality.

You will see it in decreased milk flow and general diminishing of vitality. It has been estimated that that causes anywhere from $30,000,000 to $50,000,000 of loss per annum in milk and hides. Each warble finally comes out, and there is a little hole made in the hide through which the warble finally drops out to change into a fly again. That throws the hide at least into the No. 2 class, which is a depreciation of at least $1 for each hide. Forty or fifty million hides are produced each year in the United States, so that on the hides alone you can easily figure what the damage is. We have been working with the limited appropriations we have had to develop remedies for getting rid of it, or, rather, for controlling it. We have found that a mixture of iodoform and vaseline rubbed into these holes on the back is very efficacious. There is always a little hole that the warble makes to breathe through, and by applying this ointment we get almost 100 per cent kill, but that, of course, requires constant attention during the winter, which is the time we find the warbles. The fly lays the egg along in the summer, in July or August, and you do not notice the warbles until along about this time of the year, in January or February, and from this time on until March and April is the time to treat them. We have also been experimenting on chemical washes that we can simply spread over the back, either with a brush or a spray, and to some extent we have found very good results in that way. There are also experiments under way providing chemical wading baths for the cattle to wade through when these eggs are on the legs, in order to kill them there.

Dr. HOWARD. Suppose you tell about the cooperative work in New York State. I think Mr. Magee especially would be interested in that.

Mr. WEBB. In Herkimer County, N. Y., last summer we had up with the farm bureau there a cooperative experiment, trying as near as possible to get all over that county to see how far we could actually eradicate the fly. In the dairy herds there it has been found to be fairly abundant. We had hoped later to actually handle an entire county, but we found our appropriations were not sufficient for that unless we got funds under a cooperative agreement with the county, and I understand they have not sufficient funds to put the thing through.

Dr. HOWARD. The National Tanners' Council is cooperating with us on that experiment, also.

Mr. MAGEE. How large an appropriation would be required there?

Mr. WEBB. We ought to have at least $20,000 more than we have. It would be a matter of visiting every dairy farm throughout the county at least once a month throughout the winter months and sending an inspector to look over all the cattle.

Dr. HOWARD. But we are confident we can show good results with what we have.

Mr. ANDERSON. Is the ox warble very prevalent?

Dr. HOWARD. It is all over the country; yes, sir.

Mr. ANDERSON. Where there is an infestation of it, does it attack practically all the cattle, or does it appear in isolated animals?

Mr. WEBB. Practically all of them; yes. There does not seem to be any preference for any special animals.

Mr. ANDERSON. Are many of the herds infected?

Mr. WEBB. Yes; throughout New York practically all of them have some ox warble, but some will have more than others.

Mr. MAGEE. How is the contagion carried?

Mr. WEBB. The adult fly lays the egg just above the hoof of the animal.

Mr. MAGEE. How far can this fly fly?

Mr. WEBB. It does not go very far, comparatively. I do not think we have ever made any actual test to determine how far it will go, but probably not over half a mile from where it was hatched.

Mr. **Magee.** You mean at one time?

Mr. **Webb.** Yes.

Mr. **Magee.** Then it could fly another half mile at some other time?

Mr. **Webb.** No, I do not think it would go half a mile at one time.

Mr. **Magee.** What I had in mind was that if the contagion depends upon this fly and this fly can go from place to place, if the cattle generally are infected, suppose you cleaned up a herd at some particular time, what assurance would you have that they would not soon become infected again?

Mr. **Webb.** That is the point we had in mind and that is one of the difficulties we would have, and to clean up a county in that way the county authorities would have to watch every incoming animal from any other infected district.

Mr. **Magee.** But if the fly spreads the contagion, they could not prevent the fly from coming over the boundary of the county.

Mr. **Webb.** But the fly is not going to go very far from where there are cattle.

Mr. **Magee.** Do you mean that as a general proposition the fly is carried from place to place on the body of the animal?

Mr. **Webb.** The adult fly does not stick on the animal very long; just long enough to lay its eggs.

Mr. **Magee.** You mean as a general proposition they are carried on the body of the animal, going from place to place?

Mr. **Webb.** It does not stick on the animal very long. It just stays there long enough to lay its eggs. It is very sluggish. It will hang around a pasture where it is hatched out, and will not go far from there.

Mr. **Anderson.** Is there anything further on this item?

Dr. **Howard.** The gypsy-moth estimate was handled yesterday by Mr. Burgess.

GENERAL ADMINISTRATIVE EXPENSES.

Mr. **Anderson.** The next item is general administrative expenses.

Dr. **Howard.** There is an increase asked for, Mr. Chairman, of $3,120. That is for this insect pest survey service which we established this year. During the war we got the insect pest survey going, with cooperating agencies all over the country, to keep track of the insects, and notify all the economic entomologists. This year, by the use of the money appropriated, we began this service once more, and we have carried it on by means of correspondence with a large number of voluntary agents and cooperative agents over the country and have issued monthly manifold statements of the conditions of insects and crops all over the United States. These manifold circulars have gone to the State entomologists and they find the service of very great use. We would like to put this on its feet, and we are asking for an appropriation of $3,120 for it.

Mr. **Anderson.** You employ one man?

Dr. **Howard.** One head man, who draws a salary from the stored product insect appropriation, because he was connected with that service, and we put him on this new duty, a part of the time, running this new survey. He has to have clerical assistants and so on.

EUROPEAN CORN BORER.

Then we come to the prevention of the European corn borer, on page 155. There have been some new developments since last year.

Mr. ANDERSON. Before you go into that, is there a supplemental estimate on this item?

Dr. HOWARD. I expect there will be one.

May I say that Dr. Marlatt is interested in this matter, and he would like to be heard on it, too.

Mr. WALTON. Mr. Chairman the European corn borer is a moth or miller that bores into all parts of the corn plant. It is a native of southern Europe, and has been in this country for 10 years, although it was not discovered until 1917. It was discovered at that time in eastern Massachusetts; in 1919 it was found in eastern and western New York, and in 1920 was discovered in Canada. It is in southern Ontario, but the evidence shows all of these infestations occurred about the same time, through the shipment of broom corn to this country for use in the manufacture of brooms. During the past summer there has been an extension of this insect discovered along the entire shore of Lake Erie, in Pennsylvania, Ohio, and southeastern Michigan. It is a very mild, uniform infestation of the insect.

Mr. MAGEE. In what part of New York State is the infestation?

Mr. WALTON. In the vicinity of Albany and Schenectady, and around Buffalo in western New York.

Mr. ANDERSON. There is an infestation in Canada?

Mr. WALTON. Yes, sir; probably the most intense in this country. it is doing considerable injury.

The principal activities carried on under this fund are the efforts for the prevention of the spread of the insect. Eventually it will very likely spread to the corn belt by flight or natural spread. We are endeavoring by quarantine and certification of crops to prevent any commercial spread, and so far we believe that we have been successful. We propose to carry on this same sort of service during the coming year. Under this fund we do some investigational work. We carry on the work of the importation of parasites from Europe. We have a laboratory established in southern France and are bringing into this country all of the useful parasites which can be secured for that purpose.

During last year we brought in 15,000 or 20,000 parasites, and expect to continue this service, and in this way possibly lessen the injury caused by the insect.

Mr. ANDERSON. You have no hopes of exterminating it?

Mr. WALTON. No hope whatever.

Mr. LEE. Has it reached the South?

Mr. WALTON. Not yet.

Mr. ANDERSON. You had an appropriation last year of $275,000. Your estimate this year is $125,000. What was that reduction based on?

Mr. WALTON. The estimate this year is $275,000, and the budget is $125,000.

Mr. ANDERSON. Well, I suppose the Budget officer had some reason for cutting it down to $125,000?

Mr. **Walton**. The Budget officer is here and he might wish to explain why this was done.

Mr. **Anderson**. I think we ought to know.

Dr. **Ball**. The appropriation for the corn borer was made for eradication of the corn borer.

Mr. **Anderson**. Originally?

Dr. **Ball**. Yes, and continually. When the outbreak in Canada appeared it became evident that there was no possibility of eradication. All we could do was to reduce the spread to the amount that could be done with ordinary appropriation, and continue our research work on the basis of finding some method of eventually giving the farmer an opportunity to control it. An eradication program, in which you go out to destroy anything, requires a lot of money. This appropriation was submitted, with a statement at the bottom that further investigation which was then under way would determine the amount necessary, and we could not submit it at that time. I am sorry to say that the agricultural conferences and other things have prevented our getting together and submitting a supplementary appropriation. It will probably be submitted, a supplementary appropriation, to take care of the western area, but it was not considered at that time that it would be necessary to use as much as had been appropriated under an eradication program.

PRECAUTIONS TAKEN TO PREVENT SPREADING OF EUROPEAN CORN BORER.

Mr. **Anderson**. What precautions are being taken now to prevent the spread of the insect?

Mr. **Walton**. The shipment of corn, which is the principal crop infested by the insect, has been suspended entirely from the infested areas into the surrounding country.

Mr. **Anderson**. Does that mean the ear corn?

Mr. **Walton**. Corn on the ear, and all parts of the plant, except shelled corn. There is no restriction on shelled corn.

In addition to this, other vegetables known to be attacked by the insect are certified for shipment. That work is very heavy, and requires the employment of 100 or more men during the growing season, and as many as 85,000 certificates are issued in one month in this work. In addition to that the travel of automobiles from State to State is kept under surveillance—automobiles have been stopped at the State lines, and infested material confiscated from them.

Mr. **Anderson**. You say that automobiles have been stopped and infested material taken away?

Mr. **Walton**. Infested vegetables have been confiscated in great quantities from automobiles traveling from one State to another. In this way we have tried to prevent the spread of this pest by automobiles.

Mr. **Anderson**. Is this stuff carried in passenger automobiles or trucks?

Mr. **Walton**. Passenger automobiles; corn, beets, celery; all of those things are quite heavily infested.

Mr. **Ball**. All along the roads in New England they are always selling fresh vegetables and corn.

Mr. Walton. Yes; that is a fact, selling them to camping parties and tourists.

Mr. Lee. Would a strict quarantine stop it?

Mr. Walton. It lives in other plants besides corn. It lives in most any vegetable, and 185 different varieties of plants. It prefers corn above everything else.

Mr. Anderson. How severe is the damage done by these insects?

Mr. Walton. The commercial damage is done principally to corn. During the past summer in Massachusetts there has been an average loss of 14 per cent of the grain, and that is the average loss in the heavily infested areas. The damages amount to practically nothing in the thinly infested areas. In Ontario the loss has been as high as 25 per cent of the grain.

Mr. Anderson. Does the infestation tend to grow more severe, or is it less?

Mr. Walton. It is slowly intensifying in New York. We have been watching it there for two years. In Massachustets the intensity is about the same as was found three or four years ago, although the area has increased at the rate of 6 miles per year.

Mr. Anderson. Is the increase of the infestation dependent at all, or retarded at all, by cultural methods?

Mr. Walton. Yes, to a certain extent. We found, for instance, that the utilization of stalks for silage and cattle feed, where the stalk is shredded the insect is growing in this way and shredding helps to destroy him, and it has been found that deep fall plowing in some soils helps to destroy insects.

Mr. Anderson. Does it live under the ground?

Mr. Walton. Only in the plants, in the stems, in the root of the stalk, principally in the first three joints above the ground.

Mr. Anderson. Where do you establish your quarantine officers and inspection officers?

Mr. Walton. In the infested areas. Most of the work is done in the wash rooms of the shippers. The vegetables are inspected as they are brought in from the fields. Corn in infested regions is prohibited from shipment, but beets, celery, chard, and rhubarb are inspected in the wash rooms principally, and in the markets. We also have the cooperation of the common carriers.

Mr. Anderson. Do you think it is possible in this way to have any appreciable spread of the insect?

Mr. Walton. So far during the three years in which this service has been in effect there has been no commercial spread of the insect, not a single instance, where the insect has made a large jump by commercial means.

Mr. Anderson. You think there would have been if there was not this inspection service?

Mr. Walton. Yes, sir.

Mr. Anderson. What is the need of the additional money? Is the sum you have now sufficient?

Mr. Walton. We have $275,000 this year, which is sufficient, of which we have utilized about $200,000 in quarantine, inspection, and the scouting work, which is necessary as a basis for quarantine work. Now that we have a third more area to cover it does not seem logical the appropriation should be cut down. We need more money.

Mr. Anderson. Are you doing anything in the way of eradication?

Mr. WALTON. We are not doing anything in the way of eradication at present.

Mr. ANDERSON. Did you do anything last year?

Mr. WALTON. We made some eradication experiments in limited areas. They cost $35,000. They will not be necessary again. We are satisfied that method of attacking the insect is unsatisfactory, and this money can be devoted to quarantine.

Dr. HOWARD. It should be added that we have a station in the south of France where we are studying native parasites of this insect, and we are bringing over promising species in considerable numbers. We hope that they will exercise some sort of a check and reduce the numbers.

Mr. ANDERSON. Is there anything being done in the Canadian work?

Mr. WALTON. They have declared a quarantine, to prevent the insects from being shipped out of the infested area.

Dr. HOWARD. How much money are they spending?

Mr. WALTON. I do not know. They are carrying on investigations of the insect, and have some good men engaged in the work, and they are cooperating with us very satisfactorily.

Mr. ANDERSON. Do you know how much money they are spending?

Mr. WALTON. It is not very large.

Dr. HOWARD. They are very much alarmed. Their Department of Agriculture has a force of fifty men on entomological work and a considerable number are engaged on this project.

Dr. MARLATT. This matter has been before Congress for several years, and several appropriations have been made for it. I do not think, from the beginning of the work, there has been any belief in eradication. It affects, as you have just heard, 180 odd plants, and in most of these plants, the fact that it occurs in the plants, cannot be determined easily. The plant has to be pulled up or slit with a knife. It affects corn and many flowers. The chrysanthemum may carry the pest by long jumps, and chrysanthemum culture is large in New England, near Boston; these plants are shipped in enormous quantities, almost carload lots, to Chicago, St. Louis and Cincinnati, etc., all over the middle west. There is a considerable infestation of chrysanthemum stems, and these plants furnish one of the easiest means of carrying infection to the corn belt. The same thing applies to many other ornamental flowers. The need, therefore, of quarantine and inspection to protect the country is apparent, and that is the main object. The limited local spread of the insect every year cannot be prevented. We do not pretend to prevent that.

The only means would be the eradication of the insect, but eradication involves so much that it is not possible, and I have always so stated before this committee, but the control of it is measurably possible. The continuation of this appropriation, and the continuation of the control along quarantine lines should be governed by the usefulness of that work. The moment the insect gets beyond us, and such control is no longer useful, in other words, when the protection gained is not many times worth the money spent, we had better stop. The present point of view of the Federal Horticultural Board is, that the time has not come to turn the insect loose on the country. We can, with an adequate appropriation, protect the country in great measure from long jumps, and perhaps for many years, from a general infestation.

Mr. **Anderson**. Have there been any reports of infestation outside of this area?

Dr. **Marlatt**. A great deal of scouting work has been done. Early in the study of the insect it was discovered that it came to this country in broom corn. A portion of this corn went to Boston; a portion went to the eastern New York area, and another portion went to the western New York area. These shipments accounted for the three original infestations, but account for only a fraction of the broom corn imported. The balance went all over the middle United States, some to New Orleans and St. Louis, some to Cincinnati; a great deal to Chicago, and some to Iowa. So far as we have been able to determine the distribution of that broom corn, the districts where it was utilized, have been thoroughly scouted by our inspectors. In addition all the States concerned have their own experts and entomologists on the watch, and no additional outbreaks of the insect have been determined. So far as we now know, in the United States the corn borer is limited to the districts which have been pointed out—a limited area. To hold it to these areas we must still enforce a quarantine for the protection of the great corn belt to the south and west.

Mr. **Anderson**. If infestations appear throughout the country, the possibility of any control that will be worth while will be practically gone?

Dr. **Marlatt**. Yes. So far as quarantine work is concerned.

The same thing came up in connection with the Mexican bean beetle. We promulgated a quarantine to attempt to hold this pest to the central part of Alabama. By July we found it in half dozen States surrounding Alabama, and we promptly recalled the quarantine after an operation of two months. The moment an insect of that kind gets wide foothold quarantine control is not going to check its spread very much and becomes a waste of money.

With respect to the corn borer, we had a large conference in Washington in October, with representatives from 16 States, 13 by official delegates, and the others by communication, the representation consisting of commissioners of agriculture and other State officials, and representatives of farm associations related to the utilization of corn. After a day's discussion of the subject it was agreed among us all that quarantine along existing lines was useful and desirable as a protection for a reasonable time into the future. It was felt that the time had not come to abandon it, and that we should go on with quarantine control. This conclusion is the basis for the corn-borer quarantine as now revised to include the new areas. To enforce this quarantine will require a larger fund than we have now in the estimates, and a supplemental appropriation will be needed later on if the work is to be continued. I am advised that it is too late now to take up such increase in this bill. I earnestly believe that the work we are doing is well worth while. As soon as we come to the conclusion that it is no longer worth while—that the results are not worth many times the cost—the quarantine work should be stopped, and will be stopped.

Mr. **Anderson**. What is the status of the fund this year? Have you got enough money to carry it on to the 1st of July?

Dr. **Marlatt.** I understand it will carry the work to the end of the year.

Mr. **Anderson.** Then there is no deficiency for this year?

Dr. **Marlatt.** None whatever.

Mr. **Anderson.** It should have to come up in the form of a supplemental estimate.

Dr. **Marlatt.** Yes; unless it can be brought up in time to be considered by this committee in connection with this appropriation or by the Senate committee.

NUMBER EMPLOYED IN WORK.

Mr. **Anderson.** How many people have you employed on this work now?

Dr. **Marlatt.** I will have to ask Mr. Walton.

Mr. **Walton.** Twenty-five or thirty men in the winter time. We take on a big floating force in the summer, and let them go in the winter.

Mr. **Anderson.** Where do you get the people in the summer time?

Mr. **Walton.** Generally we get intelligent laborers in New England. There are a good many mills shut down there, and we pick up intelligent men. We put them through a course of schooling in a laboratory under competent men, and by the time the season has begun they do very nicely in that work.

Mr. **Anderson.** What do you pay the men to do this work?

Mr. **Walton.** They get from, speaking offhand, I think it is $3 to $4.50 per day.

Mr. **Anderson.** Are they employed on a per diem basis?

Mr. **Walton.** Yes, sir.

Mr. **Anderson.** How long is the season that you employ these extra laborers?

Mr. **Walton.** May 1 to December 1 or 15. They ship a great deal of celery from the Boston region, and that is very late in closing out. December 15 is the end of the season.

Mr. **Anderson.** Do the people make objections to the quarantine?

Mr. **Walton.** They did at first, but now we find no opposition whatever. In fact, they appreciate the service very much. They realize that unless they did have this inspection service they could not dispose of their crops at all. The quarantine would act in a prohibitive manner.

Mr. **Anderson.** I do not imagine that a complete quarantine is practical.

Mr. **Walton.** For all vegetables?

Mr. **Anderson.** Yes, sir.

Mr. **Walton.** No; certainly not. It would do more harm than good.

DAMAGE DONE BY INSECT.

Mr. **Magee.** Now, take an infested area, and give the committee an idea of the state of the damage done in such area by this insect.

Mr. **Walton.** I think I stated a little while ago that in heavily infested areas the work of this pest actually reduced the yield of corn to 14 per cent. It destroys that much of the grain, and does additional damage by boring the stalks.

Mr. Magee. What will be the maximum damage, in your judgment, of this corn-borer on a crop?

Dr. Howard. We know in southwest Russia it is reported to have damaged 75 per cent of the crop in certain seasons.

Mr. Magee. What is in my mind is this: If you can not eradicate it, and even with the means taken there is an increasing spread of infested areas, the ultimate result will be that some time it will spread over the entire country.

Dr. Howard. It is possible, but we hope to delay that very considerably.

Mr. Magee. I know you expect to delay it, but how fast does it spread?

Mr. Walton. The natural spread is about 6 miles per year in most of the areas.

Mr. Magee. That can be extended?

Mr. Walton. That is a spread that can not be prevented. It is by flight of the moths. What we are trying to do is to prevent a long jump by the shipment of infested material.

Mr. Magee. Take the infested area—are they doing anything there to restrict that, or is there anything being done?

Mr. Walton. We are experimenting all the time, and we find that by using the crop for ensilage and for other purposes of a similar character, the insect is destroyed, and there is some virtue in fall plowing. There has been no possibility of poisoning the insect, because it lives on the inside of the plant, and it can not be reached by poison.

Mr. Anderson. These inspections you have made show, do they, that a considerable portion of the material is infested?

Mr. Walton. Yes, sir; quite a large proportion, and it is growing more heavily infested from year to year. The infestation in beets and celery this year has been twice as heavy as last year. The corn infestation is about the same.

Mr. Anderson. I presume this work can be very effectively carried on, but it does seem to me in spite of the most rigid inspection some is going to get behind?

INFESTATIONS IN OHIO AND NEW HAMPSHIRE.

Dr. Ball. Just a supplementary word, that has not been brought out. The infestation in Ohio is just along the edge of the lake, not more than 6 miles back from the lake. It is right along the shore, but of course not continuous, but merely around the lake. How that infestation got there is capable of two interpretations. There is an infestation in the Canadian crops. It may have been from some corn stalks washing down, or it may have been from the flight of the moths, driven across the lake. It has been shown that moths can alight on the surface of the water, and they flip it up in the air, and it will go on. It is there. How it gets there is another question. It is confined to the shore of the lake at the present time. The watershed, south of Lake Erie, is close to the lake. The streams here of Ohio come away up here [indicating], and the watershed is close to the lake.

All this infested area drains to the lake at the present time. It is tremendously important from the standpoint of protecting the great corn belt that it be kept from making the spread across the watershed, because when it gets across there any cornstalk falling in a stream or freshet will be carried to the Ohio and down the Mississippi River, so that our big problem, from the last standpoint, is to prevent an almost immediate saturation of the corn belt, right in the center of the corn belt, with the corn borer, and our problem is to hold the spread to the area, which is adjacent to the watershed. That means more than the quarantine. It means an extensive extension campaign to get the farmers here to take up the cornstalks, to stop it from spreading, and reducing the numbers. The numbers are small. The chances are that by taking out the cornstalks before the next spring and destroying them, or siloing them, we can reduce the number here to a large part of the areas, so it will leave only a small infestation in here [indicating], but if we allow this 6-mile-a-year spread from here [indicating] that is going to be the big problem. It will get into the watershed here [indicating]. That to-day is our biggest problem. That does not require a great amount of money. The State of Ohio will cooperate, and the States of Indiana and Michigan, but we must get hold of our extension forces and put on their campaign.

In Massachusetts the problem there is, as well as in New Hampshire and Maine—it is only just a question of a very short time when they will be distributed to the larger areas of the lake, so from the last standpoint the problem there is not so great. The problem of Ohio, from the standpoint of protecting the great corn belt, is before us, and the Massachusetts area toward the west, in the shipping of flowers.

Mr. WASON. Would one of the gentlemen tell me the source of the information that any portion of New Hampshire is in the infected district now?

Mr. WALTON. Our inspectors were in there, and they found it there, in the southeastern corner of New Hampshire.

Mr. WASON. Who are the inspectors?

Mr. WALTON. I do not know which of our inspectors were there.

Mr. WASON. Why I am inquiring is this: I am sorry I was late this morning, but my information was—I live in New Hampshire—there is no infested area in New Hampshire at this time.

Mr. WALTON. It is not true.

Mr. WASON. I should be obliged to have him show me the farm in Rockingham County, because the insect that was found was 35 miles east of where I have lived all my life, on two farms three years ago, and there has been no infection found since that season.

Mr. WALTON. I am sure you must be in error. Our inspectors got borers from southeastern New Hampshire last summer.

Mr. WASON. I will not take up the time of the committee, but if you will furnish me in writing that information, I will make somebody retract information. I am a director of the experiment station there.

Mr. WALTON. I shall be glad to do that.

Mr. WASON. On that point, what they did—the two farms—when it was found the Government inspectors went there and told them there was only one thing to do, effectively, to destroy the entire crop; those farmers did it.

MEXICAN BEAN BEETLE.

Dr. **Howard**. There is one more point under miscellaneous, the bean beetle, and I have Mr. Graf here from Birmingham, if you want to know about this work. Mr. J. E. Graf is agent in charge of this special investigation.

Mr. **Graf**. The bean beetle was found in Alabama in the summer of 1920. A little preliminary scouting late that summer disclosed the infestation in 13 counties centering on Birmingham, covering about 4,500 square miles. No funds were available for continuing the investigation at that time, but an appropriation of $100,000, $25,000 of which was made immediately available, was given us the next year. The scouting was continued, and by last fall the insect was found in 111 counties, in 6 southern States, covering an area of practically 45,000 square miles. We do not say all of this was last year's spread, but we believe that most of it was.

In these maps the red lines show the bean beetle infestation. This area [indicating] is the one we are interested in. The black dots show the production of soy beans in 1919, one dot representing 100 acres, and the map shows the relation of the infestation to the soy bean production in that area. In this map it is on the same basis, except one dot represents 1,000 acres of cowpeas. Both cowpeas and soy beans are favorite food plants of the beetle. This map shows the green beans which are harvested, one dot representing 100 acres. You will see that most of the heavily infested area, down in the southwest corner, is not a heavy producer of green beans. This map shows the production of dry beans. This also shows very few dry beans are grown in this district, but it does show that the beetle is traveling very rapidly in the direction of the States of Michigan and New York, which are very heavy producers of dry beans.

Mr. **Lee**. Are you talking about soy beans?

Mr. **Graf**. Dry beans.

Mr. **Lee**. Soy beans are sometimes dry?

Mr. **Graf**. I am talking about dry edible beans.

Mr. **Lee**. They eat soy beans.

Mr. **Graf**. People do not eat them generally.

If the beetle keeps up its spread, at the present rate, it will be in New York in three years, and in Michigan by the same time. Of course we have only a year's observations on which to base that estimate.

That much for the spread of the insect. As Mr. Marlatt stated, we found it spread by flying, the spread being so rapid that quarantine was of little value.

Both the larvæ and the adults consumed the foliage, the injury in the worst cases resulting in total destruction of the plants attacked.

I have a telegram from Mr. C. F. Bell, one of the largest commission men in Birmingham. It reads as follows:

Birmingham, Ala., *February 2, 1922.*

J. E. Graf,
Care C. H. Popenoe, 1336 Massachusetts Avenue NW., Washington, D. C.

The Mexican bean beetle affected Birmingham commission market as follows: July string beans in previous years brought 75 cents to $1, but in 1921 brought $4 per bushel hamper. September market price in former years was $1 to $2, but last season was $3 to $4, on account of destruction of bean beetle. Believe 1922 market will be even higher. From consumer's standpoint, very serious situation.

C. F. Bell.

Mr. **Graf.** I also have a telegram here from Mr. George B. McVay, jr., the largest seed dealer in that district. It reads as follows:

Birmingham, Ala., *February 2, 1922.*

J. E. Graf,
Care C. H. Popenoe, 1336 Massachusetts Avenue NW., Washington, D. C.:

Mexican bean beetle has played havoc with seedmen in sale of bean seed. During normal times, before introduction of beetle, this house sold about three carloads of beans a season. Beetle has cut our sales to point where it would push us to sell car to car and a half, and much of this will go out of beetle territory as existed last year. Market gardeners who had been planting bag of 120 pounds are planting this season 10 to 20 pounds merely to have a few beans and run a chance of escaping destruction by planting very early. Sale of insecticides has been large, as growers have tried everything possible in an effort to combat this beele. I feel sure that any measures your department will take toward controlling this beetle would be met in good spirit by both seedsmen and market gardeners.

Geo. B. McVay, Jr.

Mr. **Graf.** Apparently the beetle has taken on some new habits in the Southeast. In the first place the maximum number of generations in the West was two a year. In the Birmingham district this year the number was four, and a few individuals of a fifth generation were brought through, indicating that it increases a good deal faster in the East than in the West. As each female lays about a thousand eggs, this is material.

The problem of control is one we have studied with varying success. We have proved that our worst fears have been realized, and that is the beetle is difficult to control. It will leave parts of a plant treated with arsenicals, and feed on the untreated parts, and we have difficulty in keeping arsenic on every part of a fast-growing plant. The bean is particulary susceptible to burning by arsenicals and in a humid climate we are likely to have a very serious arsenical injury. On the top of this, we have difficulty in controlling an insect on any crop, some part of which may be grown for canning. A canner will not at the present time take the chances of treating his vegetables with arsenic as it might, if generally known, cause the public to refuse to buy his products.

We have planned next year to carry on some work in Birmingham, in order to cover the main infestation, and of having a substation at Chattanooga, for the consideration of the beetle under mountain conditions, and one at Thomasville, Ga., to study the beetle at its southernmost point. The Thomasville infestation is isolated and covers about 16 square miles. In addition we have planned to try to develop a control for the insect in New Mexico. Growers in one county lost $100,000 in beans totally destroyed last year, aside from those only partially destroyed. It is doubtful if we will be able to carry on all of these stations this next year, on acccount of the reduction in funds, especially if we continue our search for parasites in Mexico. A man was sent to Mexico this summer. He was gone two months and found one natural enemy of the beetle, but unfortunately his trip was made too late. We considered that conditions in Mexico would agree with those in Alabama, but on account of the high altitude the beetle hibernates much earlier, and the investigation was made too late. We have several native insects which prey on it, but they are unimportant.

Mr. Anderson. You have no hopes whatever of controlling the spread of the insect?

Mr. Graf. No, sir; this is one of the insects that is not domesticated. It will come and eat with the farmer, but it will not sleep with him. It goes to the woods to hibernate. Our field men have determined that it may travel 5 miles in two days to hibernate, and, of course, it will also travel some distance in emerging from hibernation in the spring. This is in addition to the natural spread during the growing season.

Mr. Anderson. Your work then comes down to dimensioning or controlling the ravages of the disease?

Mr. Graf. Yes, sir; that is about the size of it.

Mr. Anderson. What proportion of the funds you had this year were spent on eradication or quarantine work?

Mr. Graf. Most of our funds were spent on scouting. About the time we got well started we found, as Mr. Marlatt says, the quarantine was useless. It was spreading so rapidly that we could not hope to hold it down. We had eight men for two months on quarantine work. These men were receiving a salary of $1,500 per annum and their traveling expenses. They had to travel a great deal at the time, and the expense would average from $85 to $125 a month per man.

Mr. Anderson. What is the status of the control work in the sense of controlling the activities of the insect? Is that a laboratory proposition?

Mr. Graf. Partially. We have established field laboratories for this work but practical large scale field tests with remedies are necessary and are a part of the investigation.

Mr. Anderson. You have no means worked out now?

Mr. Graf. We have not developed much that we feel is safe. Trained chemists or entomologists may get good results by dusting the bean with arsenicals, but the margin of safety is at present so small that the average farmer can easily ruin his crop with the same materials. It takes an expert at the present time to be certain of the right remedy. A grower visited our plots, and found we were getting good results, so he obtained the formula, and used exactly the same amount of arsenical, but added soap to the poison as a "sticker" and completely ruined his crop.

Mr. Anderson. Is there any hope of preparing any insecticide that will put these fellows out of business?

Mr. Graf. Our main work at the present time is an attempt to adapt the insecticides now in general use so that they might be a safe and sure control, but, at the same time, we are working on new insecticides, because we feel that the ultimate solution will depend on a new insecticide.

Mr. Anderson. You have nothing at the present time which you feel safe in advising these people to use?

Mr. Graf. Not if we had to stay around in their neighborhood afterwards.

Mr. Lee. Tell me how they attack soy beans, because I grow them.

Mr. Graf. They defoliate the plant. They eat every part of the leaves except the upper layer of cells, so that when they have killed the plant you will find that the leaves, the upper layers, are still there white and dead. Dust applied to the upper surface of the leaves above will therefore not give effective control of the insect.

Mr. **Lee**. I live in northwest Georgia.

Mr. **Graf**. That is infested territory, but it is the first year the insect has been there. Next year you will undoubtedly become familiar with it.

Mr. **Lee**. I will quit growing them when it comes.

Mr. **Graf**. I do not know that you will have to quit growing soy beans. In some cases it causes heavy injury to this species. If there is anything in the Hopkins principle of host selection, we may develop a race of beetles which will feed even more destructively on soy beans and cowpeas. They must necessarily learn to eat these other beans, because not enough garden beans are grown in this territory to feed the immense numbers of the insect which will undoubtedly develop.

Mr. **Lee**. Will they not starve?

Mr. **Graf**. No; they seem to object to that.

Mr. **Lee**. I have grown soy beans very successfully, and I have not had any trouble.

Mr. **Graf**. That is a heavy producing soy bean country, and cowpeas and soy beans are not only used for food and feed, but for building up the fertility of the soil, and they are very necessary.

Mr. **Lee**. Henry Ford's scheme at Muscle Shoals would help the fertility.

Mr. **Graf**. In case it should develop that this insect should run soy bean and cowpea growers out of business, even Henry Ford's nitrates will not make up for the deficiency of fertilizer in the soil.

Mr. **Lee**. It would help a little.

Mr. **Graf**. It will help some, but it will not put the humus in the soil.

Mr. **Lee**. I grow from 1,000 to 2,000 bushels a year, and I have had no trouble.

Dr. **Ball**. I think it is only fair to say that this beetle has been in the Rocky Mountain region for ages and has not before this time come out, and this infestation is in the mountain section of the South. The beetle may not be as bad when it gets into the other country.

Mr. **Lee**. Has the department gotten out a bulletin in relation to the soy beans for food?

Mr. **Graf**. I am not certain, as that subject is not in our line.

Mr. **Lee**. You thought they would not be good for food.

Mr. **Graf**. The horse bean and other highly flavored beans are eaten by the Mediterranean races, but most people will not eat them, at least, not generally. Answering Dr. Ball's statement, we were inclined at first to believe that the insect would not cause as much injury in the South, on account of the difference in altitude between the Rocky Mountain region and the Birmingham district, and that the injury of the first year might be a "flash in the pan," but it came back twice as bad the second time. The altitude of Birmingham is 600 feet. It is not really mountainous country. The hills go up to 1,000 feet, but that is practically level country, so far as this insect is concerned, especially when we consider that the heavy injury in New Mexico is caused at an altitude of 7,000 feet, so there appears to be not much hope on the mountain theory. We are convinced that it will be at least equally injurious to beans in the rolling or level plains of the East.

Mr. **Anderson**. Does not the presence of woods have any check? I understand that this fellow hibernates in the woods?

Mr. **Graf**. Yes, it hibernates in the woods, but the eastern country is all heavily wooded. Practically all of the lands in the Southeast not cleared for agricultural purposes are heavily wooded. There will therefore be no lack of suitable hibernating quarters.

Mr. **Magee**. I notice you asked for a decreased appropriation. What have you to say about that?

Mr. **Graf**. I do not know, except that the decrease was not requested by the Bureau of Entomology. Our recommendations were for more than double the amount shown in the budget.

Mr. **Magee**. I want your views as to what appropriation you think you ought to have taken into consideration.

Mr. **Graf**. Do you want me to state a specific sum?

Mr. **Magee**. You have an appropriation of $100,000, and the present year the appropriation is $25,000. I do not care whether you say anything or not.

Dr. **Ball**. $100,000 was for quarantine and eradication. That has been abandoned. This is an appropriation for investigation of methods of control and for the introduction of parasites. It is much larger than the amount spent last year.

SUMMARY OF EMPLOYEES OF BUREAU.

Dr. **Howard**. I would like to insert in the record a summary of the employees of the Bureau, classified, scientific, and otherwise, and also the statement that during the year that 43 of the scientific men have resigned and 19 of the clerical force.

Mr. **Anderson**. Where do these scientific men go, when they resign, these entomologists?

Dr. **Howard**. To the colleges, or they leave and go into business or other pursuits.

(The summary referred to is as follows:)

Summary of employees of the Bureau of Entomology.

In Washington:	
Scientific and technical	76
Clerical, including messengers, charwomen, etc	73
Total	149
Out of Washington:	
Scientific and technical	250
Clerks, mechanics, and laborers	60
Collaborators	89
Total	399
Average number of day laborers employed during the calendar year:	
Preventing spread of moths	188
Corn borer	135
Cotton boll weevil	120
Mexican bean beetle	90
Japanese beetle	20
Total	553

Total number of scientific and technical employees in bureau	326
Total number of clerks, messengers, charwomen, mechanics, etc	133
Average number of laborers employed in the bureau	553
Total	1,012

MONDAY, FEBRUARY 6, 1922.

BUREAU OF BIOLOGICAL SURVEY.

STATEMENTS OF DR. E. W. NELSON, CHIEF; AND HON. DAN A. SUTHERLAND, TERRITORIAL DELEGATE FROM ALASKA.

SALARIES.

Dr. **NELSON**. Mr. Chairman, do you desire me to begin with a statement concerning the promotions proposed in statutory places?

Mr. **MAGEE**. You might make a short statement of what you have here. Just a general statement.

Dr. **NELSON**. We may pass over the proposed promotion of the chief and consider the others specified in the printed statement. The purpose of all these promotions is simply to bring the salaries of certain employees up to the standard in the department for the work being done. The biological survey has for years been handicapped in holding competent employees owing to its lower average in salaries than in most other bureaus. We have been trying to get them up gradually, and this is an effort to put them in line with the other bureaus for these positions. I do not believe there is any need to go into detail, because the places involved are set forth in the printed statement.

I would like, however, to call your attention to the case where it is proposed to drop one place at $1,000 and substituting therefor a position paying $1,800, which is for the purpose of providing for a higher grade clerk.

Mr. **MAGEE**. Is that explained in the note?

Dr. **NELSON**. Yes; that is in the first paragraph.

If the committee is not to take action on these proposed promotions, I should like to have that $1,000 place retained.

Mr. **MAGEE**. Just where is that?

Dr. **NELSON**. That is in the eighth line from the top of the first printed paragraph.

Mr. **MAGEE**. You have now three places at $1,000 and you propose to reduce that number to two, but if there are no increases allowed, you want to go back to three?

Dr. **NELSON**. Yes; I do not wish to lose the $1,000 place in case no action is taken.

MAINTENANCE OF THE MONTANA NATIONAL BISON RANGE AND OTHER RESERVATIONS.

Mr. **MAGEE**. Very well. The next item is on page 157.

Dr. **NELSON**. The first is for the maintenance of the Montana National Bison Range and other reservations.

We have 70 game and bird reservations in the country. They are distributed in many parts of the country from the Tortugas, off the southern end of Florida, to Alaska and the Hawaiian Islands.

There are 65 bird reservations that have been established in order to protect breeding places for birds of many kinds.

The other five are game reservations, most of them also bird reservations, but with the primary purpose of protecting large game.

The Montana National Bison Range contains 18,521 acres under fence, on which are 390 bison, 275 elk, 56 antelope, and 69 deer.

The Wind Cave Game Refuge in South Dakota has 4,160 acres under fence. On it there are 72 bison, 150 elk, 33 antelope, and 2 deer.

The Niobrara Game Refuge in Nebraska contains 16,135 acres, only 433 of which are fenced. There we have 36 bison, 50 elk, and 1 deer. This refuge is part of an old military reservation. The fence is being extended here from year to year to accommodate the increasing number of animals.

At Sullys Hill, North Dakota, we have 600 acres fenced, inclosing 10 buffalo, 44 elk, and 3 deer.

Mr. Lee. Do they have to be fed during the winter?

Dr. Nelson. Some feeding is done at Sullys Hill and at Niobrara, but on the others little or no feeding is needed.

Mr. Lee. I thought that it snowed so hard and the snow got so deep that they could not get food.

Dr. Nelson. That is rare at the fenced refuges, except at Sullys Hill, which is the main point where we are likely to have trouble; and the Winter Elk Refuge in Jackson Hole, Wyo., which is purely a feeding station.

It is necessary to maintain a permanent warden system at each of these game refuges to look after fences and to guard the animals. They must be protected from predatory animals which get through the fences and kill them and from poachers; and wardens on small salaries are kept at many bird reservations.

In addition, we have the Winter Elk Refuge, in Jackson Hole, Wyo., where we have 2,000 acres, several hundred of which are maintained as producing hay fields to supply winter feed for the elk. We put up over 600 tons of hay last summer, which, with the surplus on hand from the previous year, gave us more than 1,000 tons with which to begin this season. It costs us about $2.45 a ton to cut and stack this hay. According to a report received from the warden to-day, the winter in that region is a severe one and more than 4,000 elk are now on the Jackson Hole feeding grounds. The animals are in good condition; but if the winter is a long, hard one the warden fears the hay may become exhausted before the end of the season.

That might be unfortunate since the last part of the season when the animals have become poor is the critical period for them.

Mr. Lee. How far are they from the railroad?

Dr. Nelson. Nearly 30 miles across the mountains.

The ranchers in that neighborhood have hay.

I do not know whether you recall it, but two or three years ago there was an emergency appropriation and we used about $36,000 to buy hay in order to save thousands of elk from starvation.

Two wardens are required here in connection with the hay farm and the feeding, and at times temporary labor is employed. The place is equipped with the necessary tools and implements. At the end of the hard season two years ago the Jackson Hole, or Southern Yellowstone elk herd was reduced to about 9,000 from approximately 15,000 animals. Last spring there was an unusually good crop of fawns and the herd is again on the up-grade to replace its losses, unless the present winter brings unusual losses.

The Governor and the Game Commission of Wyoming are actively interested in helping maintain this elk herd and the Biological Survey and the Forest Service are cooperating to the same end. A representative of the Biological Survey will leave Washington in a few days to go with local men into the mountains of Wyoming to learn the situation and what can be done to permanently better it.

It is hoped it may be practicable to establish several wintering places so that the great herd centering at Jackson Hole may be dispersed and so have a better opportunity to utilize natural forage.

Mr. LEE. What do you do with the surplus elk?

Dr. NELSON. The State of Wyoming has an open hunting season for elk in certain counties from September 15 to November 15 during which each hunter is permitted to kill one elk. At the north end of the Yellowstone Park the northern elk herd drifts into Montana, which also has an open hunting season which uses up any surplus of elk there.

Mr. LEE. You distribute a few to city parks, do you not?

Dr. NELSON. A few have been sent from Jackson Hole to restock areas in parts of the West, but the hunters really take care of the surplus.

Mr. LEE. But when a request is made and expenses are paid, you do furnish them to the city parks, do you not?

Dr. NELSON. Elk for such purposes are usually supplied on the terms mentioned from the northern part of the Yellowstone Park by the National Park Service, as the shipping point at Gardiner is very near where the elk are captured and thus avoids the long haul to the railroad from Jackson Hole. The Biological Survey works in cooperation with the National Park Service in the distribution of elk for restocking and other public purposes.

Mr. LEE. Would they thrive in the southern mountains?

Dr. NELSON. In the mountains, undoubtedly, yes, but a few years ago some were introduced in the lowlands of Louisiana which have failed to breed. They do well on the Wichita game preserve in Oklahoma.

Mr. LEE. Did Mr. Vanderbilt get any for his North Carolina reserve?

Dr. NELSON. About 15 were placed there several years ago. The elk is a robust, powerful animal not adapted to a settled district. Some years ago, against advice, some were introduced in Virginia.

The result is that in some places they have become a pest. Elk should be introduced only where they have a big forest territory not occupied by farms.

The Aleutian Island bird reservation includes a great chain of islands extending off the west coast of Alaska. A warden is maintained there who is making a reconnoissance of the islands as rapidly as possible to determine their characteristics and adaptability for grazing reindeer and other live stock, or for fox farming. We have been fostering such development whenever we have opportunity in these islands without unduly interfering with the bird life. One company from Portland, Oreg., has spent a large sum experimenting with sheep in these islands.

Mr. LEE. Does it get very cold there?

Dr. NELSON. It rarely goes below zero. It is a rather mild climate for such a northern latitude owing to the influence of the warm Japanese current which sweeps along their southern border. The climate is a stormy one.

Some years ago we put a few reindeer on one of these islands. They were turned loose and have run wild ever since. Last winter our warden reported that they have increased to about 200 animals, thus showing the suitability of the location.

Mr. LEE. Are there many people living there?

Dr. NELSON. No; there is just a little group of Aleutian Islanders. They are fishermen who rarely bother the reindeer.

We must maintain warden service if the reservations are to be protected and serve their purpose. If it were not for the financial situation, I would have put in an estimate for an increase in order that we might take better care of the reservations. It is obvious that 70 widely scattered reservations require much attention.

Mr. MAGEE. With reference to these game and bird reservations, are they separate or are both the game and the birds on the same reservation?

Dr. NELSON. Sixty-five bird reservations are purely bird reservations, but five are combined big game and bird reservations.

Mr. MAGEE. On the big-game reservations, with reference to elk, when is there an open season?

Dr. NELSON. There is no open season on the reservations.

Mr. MAGEE. Then, what do you mean when you speak of an open season?

Dr. NELSON. The State of Wyoming has by law fixed a period when elk may be hunted within certain counties.

Mr. MAGEE. That is outside of the reservation, is it?

Dr. NELSON. Yes; outside of the 2,000 acres at Jackson Hole and outside any other State or Federal game preserve.

Mr. MAGEE. No one shoots them on the reservation?

Dr. NELSON. No, sir.

Mr. MAGEE. Are they limited to a certain number when hunting?

Dr. NELSON. Yes; they have a bag limit of one elk a season for each licensed hunter.

Mr. MAGEE. Do you know when the open season begins?

Dr. NELSON. Yes. It extends from September 15 to November 15 in Wyoming; in Montana the open season on elk in certain counties extends from October 15 to November 15 with a bag limit of one elk a season to the hunter.

Within the fenced game refuges no game is hunted. As a result the matter of disposing of the surplus elk and buffalo is a problem we are now studying. It will probably be necessary to secure authority to kill surplus bulls and market the meat since the demand for restocking and exhibition purposes will not take all of them. When this is done these reservations will probably become self supporting.

NUMBER OF BUFFALO.

Mr. **Lee**. I remember that two or three or four years ago, I think, it was said we had less than 1,000 buffalo in America.

Dr. **Nelson**. Yes, that is true.

Mr. **Lee**. How many are there now?

Dr. **Nelson**. I have some rather interesting information on that subject. In the United States at present there are nine Government herds containing 1,032 buffalo and a number of private herds containing 2,495, making a total of 3,527; in Canada there are 5,716, mainly in Government herds.

A few years ago the number in this country was down to about 1,000 and these interesting animals were in imminent danger of extermination. People became awakened to this and measures were at once taken which have eliminated this danger. There are now more than 9,000 buffalo in North America.

In Canada the disposal of the surplus from their herds of more than 5,000 buffalo is now being undertaken. They are trying to work out a system for disposing to advantage of both the hides and the meat.

IMPROVEMENT AND MAINTENANCE OF GAME PRESERVE IN SULLYS HILL, NATIONAL PARK, N. DAK.

The general appropriation of $39,735 asked for here to care for all but one of the bird and game preserves is the same as the amount we have for this year. In addition we are asking for $5,000 to improve and care for the Sullys Hill Game Preserve in North Dakota.

Mr. **Magee**. Is that a part of this appropriation?

Dr. **Nelson**. It is an item by itself at the head of page 159. We have a resident warden there and feed the animals in severe winter weather. The place is much frequented by visitors and improvements for their comfort are being made. North Dakota is a level country with few attractive scenic features to lend variety to that region. Sullys Hill Game Preserve is exceptional in this respect. It is located on the shore of Devils Lake, and has within it one of the highest hills anywhere in that region, also a small forest and a little lake. The tree growth is small but rather picturesque and furnishes shade for an attractive picnic ground. These attractions and the game animals serve to attract people from a large part of the State. On pleasant Sundays hundreds of them come in automobiles from all directions. It is a favorite excursion point to the people of that region. No shelter or other conveniences existed for the visitors and the last few years we have been gradually providing them in a modest way.

Last year an increased appropriation of $2,500 was made for the construction of new buildings, in order to expedite the completion of the improvements but in view of the financial situation we are willing now to drop that and make our improvements more gradually from the regular $5,000.

FOX FARMING IN ALASKA.

Mr. **Sutherland**. Speaking of the appropriation for Alaska, my particular interest is in the amount asked in connection with the fur industry. The islands up there are occupied by blue foxes. I have a letter here to the effect that 40 foxes have been stolen. The writer tells me of a fox man on an island who lost 24 skins. They have been stolen by robbers. He thinks if we had a fox warden in this vicinity they might prevent those thefts.

Mr. **Anderson**. How extensive is this fox farming up there?

Mr. **Sutherland**. There are some large fox farms up there. In the southern section they say one fox farm is estimated to have as high as 800 or 1,000 foxes. Some of these men are getting as much as $400 a skin, or were getting that a few years ago. I do not know just what they are getting now. I would like very much to have a game warden placed there to prevent the poaching that is now going on. I presume that on a little island where there are several hundred foxes a great many of them go into a cave, and it is not difficult to go in there in the night and get quite a few of them. Dr. Nelson can probably explain it when he comes to it. That is a part of the appropriation that will come up for consideration later on.

REST HOUSE FOR WOMEN AND OTHER IMPROVEMENTS.

Mr. **Anderson**. Do you think you can progress fast enough with this appropriation of $5,000?

Dr. **Nelson**. I think so. We have nearly completed an attractive little resthouse for the women. Then we wish to put an outlook pavilion on the top of the hill, from which there is a fine view, one or two pavilions over the long tables under the trees, a water-supply system, parking place for automobiles, and other conveniences. I think that during this and next year we can probably complete it with this appropriation.

Mr. **Anderson**. I am a little bit interested because I know some of the conditions out there, and I know what is needed where they have such conditions as they have in North Dakota.

Dr. **Nelson**. I became interested from that point of view, because it means so much to those people. It is the one place of its kind in that region where the people go to have a pleasant day in the woods.

Mr. **Wason**. In dollars and cents what do you think it will cost to complete these buildings?

Dr. **Nelson**. The expenditure of approximately $2,000 each year for the next two years will enable us to complete the improvements now under way.

Mr. **Wason**. How much will that be?

Dr. **Nelson**. About $4,000 in all. We will probably use $2,000 each year out of this item of $5,000. Of course, if we had $2,500 additional we could rush the work through and probably complete it next year, that is, during 1923, but, as I say, I have been trying to economize.

Is there anything further about these reservations that the committee cares to hear?

FOR INVESTIGATING THE FOOD HABITS OF NORTH AMERICAN BIRDS AND OTHER ANIMALS IN RELATION TO AGRICULTURE, ETC.

Mr. **Anderson**. The next item is on page 160, and that is the general item for the destruction of rodents.

Dr. **Nelson**. The work under this item is the suppression of predatory animals, destruction of injurious rodents, the conducting of an experimental fur farm, which is mentioned here in connection with fur-bearing animals, and investigations in economic ornithology.

The predatory animals consist of wolves, mountain lions, bobcats, coyotes, bears, and others These are extremely destructive to live stock. Rodents exist in great variety and in enormous numbers. The most notable kinds are the prairie dog, many kinds of ground squirrel, the pocket gopher, jack rabbit mainly west of the Mississippi River, and many kinds of mice and rats, including the house rat, which are generally distributed.

The prairie dog, which lives on millions of acres of land in the West, is an extremely destructive animal to both grazing and to cultivated crops. In the areas where they are numerous they keep the forage down so that the ground appears almost bare. Mr. Charles Springer, one of the principal stock growers of New Mexico, has given me an estimate of the damage done the grazing in that State by these pests. While the chairman of the council of national defense of his State he had his county representatives make an estimate of the effect of prairie dogs in their counties and the resulting conclusions was that if prairie dogs were exterminated in New Mexico, 400,000 more cattle could be put on the range, or 1,500,000 sheep.

In addition to their destruction of forage, they are exceedingly destructive of crops. If anyone goes out into the prairie dog country and begins to grow crops the prairie dogs immediately concentrate about the new food supply. In some districts ranches have had to be abandoned simply because the farmers could not protect themselves against this pest.

Mr. ANDERSON. Have you the method of handling this fellow pretty well worked out?

Dr. NELSON. Yes. We are handling the prairie dog very successfully on a large scale.

In southern Arizona there is one area of about 300,000 acres of very fine grazing and agricultural land, in a valley, which was heavily infested and where our campaign has exterminated them over all but one little corner of it. I am informed that since the prairie dogs have disappeared a good crop of wild hay is being cut from this previously barren land. Last fall one of the largest stockmen there reported that hay grew so rank in the former prairie dog territory that he had plowed fire guards to prevent it being swept by fire. In our investigations of prairie dog damage to range forage we have inclosed small areas with woven-wire fence, excluding these animals, and have fenced adjoining areas against cattle but admitting the rodents. The result at the end of the growing season forms a good object lesson. In the tract accessible to the prairie dogs the grass is kept cut down close to the ground, while in the protected inclosure it grows from 20 to 36 inches high.

Mr. ANDERSON. How do you get rid of them? How do you go after them?

Dr. NELSON. We kill them with poisoned oats, coating the oats with a mixture of starch, strychnine, and soda. The soda is to delay the bitter taste of the strychnine so that the dogs will not notice it so much. The mixture is stirred up until each grain is coated with a film of the poison. Then the men go out in squads, sometimes on horseback and sometimes on foot, distributing the poisoned grain systematically over great areas. This work is being conducted on a tremendous scale. When we first began the western people thought that men from Washington could not teach them anything about handling these pests and were at times reluctant to join us. When we began to make demonstrations they began to take notice, and the outcome has been that during recent years they have been spending an increasing amount of money in cooperating with us, totaling during the past two years about $1,676,000. For the present fiscal year the cooperators will spend about $1,041,175 in rodent work as against our $148,330.

COOPERATION BY STATES, ORGANIZATIONS, AND INDIVIDUALS.

Mr. **Anderson**. Is this amount of $1,000,000 that you speak of made up by contributions from individuals?

Dr. **Nelson**. It is made up from various sources, including direct State appropriations, county, and local organizations, and individuals.

In the State of California they are spending over $300,000 in a great campaign against ground squirrels. The entire rodent control work is a great task, as is evidenced by the record during the cooperative work that the rodents have been posioned on more than 70,000,000 acres of private lands and more than 7,000,000 acres of the public domain. In the end the heavy losses from these pests will be eliminated. When the work began, in 1915, California figured that the annual losses from rodents, mainly ground squirrels, exceeded $30,000,000; the estimate for Montana was $20,000,000, and other States in varying numbers of millions.

Mr. **Anderson**. Is that the pocket gopher?

Dr. **Nelson**. No. The ground squirrel resembles tree squirrels but makes a burrow in the ground, where he lives.

Mr. **Anderson**. Is he the little red squirrel?

Dr. **Nelson**. No, sir; it is a different animal.

Mr. **Magee**. How do you know that you have exterminated them?

Dr. **Nelson**. By their disappearance.

Mr. **Magee**. Do they come out on the surface of the ground?

Dr. **Nelson**. Yes. They are day animals and run about and feed on the surface, so they are very noticeable wherever they occur.

Mr. **Magee**. I mean when they get poisoned.

Dr. **Nelson**. Many of them die on the surface of the ground, although some get into their holes before the poison kills them.

Mr. **Magee**. They do not die in the burrows?

Dr. **Nelson**. Many of them do; but enormous numbers die on the surface. In one instance, in Arizona, as a result of one day's work at a cost of less than $10, more than 1,600 dead prairie dogs were picked up, piled in a heap, and photographed.

The rodent campaign in California has been very successful. A few years ago in the great San Joaquin Valley ground squirrels swarmed almost everywhere, but now one can drive for hours in an automobile without seeing one.

If you do happen to see one, he will probably be running for his life. The survivors have lost faith in man.

In North Dakota another kind of ground squirrel also does millions of dollars worth of damage a year. Here is one [exhibiting squirrel]. This one [indicating] is from Montana. You can see that they are different. There are also several other kinds of these pests, but these I am showing are typical. These animals exist in untold millions, and they have increased in numbers with the increase in food from crops. Formerly they lived in comparatively moderate numbers, feeding on grasses and other native vegetation, but cultivated crops have given a greatly increased food supply which has caused them to increase in some localities until successful farming was almost impossible.

Mr. LEE. Are they good to eat?

Dr. NELSON. No. A prejudice exists against the ground squirrel and people do not eat them. Here is the skin of a prairie dog, one of the worst rodent pests. All of these rodents appear insignificant individually and people sometimes think it foolish to destroy ground squirrels or prairie dogs, but if they had a ranch in the country of these pests they would not smile, for they are a very serious drain on crop production that needs prompt attention.

In 17 Western States we have an organized force working on rodents and in 16 of practically the same States we have a predatory animal organization with a head man in charge of each line of work. On Government lands we employ men to destroy the rodents, but on private lands our men act in an educational way to help organize and guide the people to clear their personal holdings, usually by community organizations.

The cooperative fund put up in the States for predatory animal work amounts the present year to $269,293. Predatory animals are mainly on Government lands, on the forest reserves, and other wild country, where they live and do most of their damage.

FOR THE DESTRUCTION OF PREDATORY ANIMALS.

Mr. ANDERSON. In this predatory animal work do you hire hunters?

Dr. NELSON. Yes; we hire hunters and trappers, but we have found that the territory is so great that for several years we have been increasingly impressed with the practical impossibility of cleaning out predatory animals through hunting and trapping. Money sufficient to employ the army of men needed to cover, such a vast territory would not be granted. As a consequence, we have been investigating and experimenting on a large scale and find we can destroy these animals on a much greater scale by the use of poison, combined with trapping.

In 1915 we began the predatory animal work and have taken, up to the present time, skins and scalps of more than 156,000 of them. We have undoubtedly poisoned during that time an equal number, so that we have accounted for something over 300,000 stock-killing animals. If you will consider for a moment what that means in the saving of the live stock that these animals have killed, it would appear that the results are worth while. Among the predatory animals we have killed have been about 4,000 big gray wolves. These animals are tremendously destructive to stock. We have turned into the Treasury more than $248,000 of cash for the skins received.

Mr. ANDERSON. Since when?

Dr. NELSON. Since we began this work in 1915, and we have about $20,000 worth of skins on hand now. In other words, we have taken about $268,000 worth of skins of these animals, and that goes to the general fund in the Treasury.

Mr. **Lee.** You can not use them where you poison the animal, can you?

Dr. **Nelson.** Yes; if they are found soon enough. In cool weather if they are found within 24 hours they are usually all right. In very cold weather they remain good longer than that. In spring, summer, and early fall the skins are practically valueless.

Mr. **Anderson.** Are you still carrying on the hunting campaign?

Dr. **Nelson.** Yes; we are working a combination of trapping and poisoning. In poisoning campaigns we are getting the active cooperation of many stock growers and are covering great areas with much success.

In addition to the cooperative funds expended during the past year more than 104,000 farmers and stock growers took personal part in the work.

According to estimates made by State extension service officials and others, including our field men, the annual losses from field rodents amounted to about $300,000,000.

The losses on live stock at the same time was determined to be between $20,000,000 and $30,000,000. The losses from both these sources have been greatly reduced as the result of the campaigns which have destroyed over 300,000 predatory animals and poisoned rodents on nearly 80,000,000 acres.

In several of the States the farmers have estimated the benefits they derived from this work at from $12 to $20 for each $1 expended.

POCKET GOPHERS AND JACK RABBITS.

In addition we are carrying on control work against several other rodent pests, among which are the pocket gopher and jack rabbit.

The State College of Agriculture of Kansas has estimated that the pocket gopher annually destroys about one-tenth of the alfalfa crop in that State. This crop is valued at $50,000,000 a year, so they are losing approximately $5,000,000 by this small beast.

PINE MOUSE AND MEADOW MOUSE.

In the eastern part of the United States, while the climatic conditions are not so favorable to the abundance of rodents as the drier West, several seriously harmful species occur. For instance, the little pine mouse that lives largely underground destroys orchard trees on an enormous scale, losses from this source amounting to many millions of dollars.

Mr. **Magee.** In what way?

Dr. **Nelson.** They gnaw the bark off the roots underground, thus girdling them, and the orchardist is surprised to see his trees die without apparent cause. In Frederick County, Va., the fruit growers' organization has reported that in two winters they lost more than $250,000 worth of apple trees from this pest.

Mr. **Anderson.** How do you handle them?

Dr. **Nelson.** They are killed with poisoned grain, wheat being commonly used. We advise the clearing away of all weeds and grass around the base of the trees so as to take away the shelter. Then poison-coated grain is placed in wide-mouthed bottle like a milk bottle and laid on its side on the ground near the base of the tree.

The mice soon find the grain and are killed while the bottle protects the poison from the weather and makes a continuous protection to the tree.

Mr. ANDERSON. Will not that kill all the birds?

Dr. NELSON. No; the birds can not get at the poison in the bottle.

Mr. LEE. I mean if they can get it.

Dr. NELSON. That might be true with wheat. Birds do not eat oats such as we use in poisoning prairie dogs and similar animals. They do eat wheat and for that reason we avoid its use except when protected from access by birds.

Mr. MAGEE. What do you call that little animal?

Dr. NELSON. It is the pine mouse.

This [indicating the specimen] is a meadow mouse, another little rodent that lives in the same localities. It sometimes does damage of the same character as the pine mouse, but much less of it. These two specimens show how much alike some of these small animals appear and how necessary it is to have definite knowledge of the species in order to know what to do to combat each according to its habits. We have been very successful in helping people protect their orchards against these mice.

NUMBER OF HUNTERS OF PREDATORY ANIMALS EMPLOYED.

Mr. ANDERSON. How many hunters have you now employed in connection with this predatory animal appropriation?

Dr. NELSON. On the Biological Survey pay rolls are about 120 men and about 132 men are working cooperatively and paid by the States. The exact number varies with the season.

Mr. ANDERSON. Are you going to continue that work on the same scale?

Dr. NELSON. Yes. Both this rodent and predatory animal work must be continued, for if we were to stop after all these years of work the pests would probably breed back so that they would be almost or quite as bad as they were to begin with. In other words, we must keep up a progressive campaign which will gradually wipe them out.

For example, take the big grey wolves. We will within a few years have them exterminated except on the borders of Canada and Mexico, where they are constantly crossing the line, especially from Mexico. We have to keep hunters near certain parts of the Mexican border all the time in Arizona and New Mexico. When we began this work in New Mexico, it was estimated that the State contained about 400 wolves. Now there are probably less than 30.

TRANSMISSION OF RABIES BY PREDATORY ANIMALS.

In addition to their ordinary destructiveness, predatory animals have and transmit rabies. The outbreak of this disease among them in five western States was so serious in 1915 and 1916 that a special appropriation of $75,000 was made to control it. We stopped the spreading of that outbreak after it spread to one other State and have held it in these six States ever since. It was obvious from the way the disease was spreading that if it had not been checked it would have gone over all the Rocky Mountain and perhaps other States. An idea of what this disease means is indicated by the record in those six States of 2,154 people who have been bitten by rabid animals and took the pasteur treatment, while 59 who failed to be treated have died. In Nevada the first year of the outbreak it was estimated that the loss of live stock from this cause amounted to $500,000.

The rabid coyote or other predatory animals would go to a corral and bite every animal in it and all would die. That went on all over the State. Now rare sporadic cases in all six States occur, which we concentrate on and promptly control, except in the case of what appears to be a severe outbreak in eastern Washington that is giving us trouble. Just as in the case of the need to keep the campaigns going to prevent the breeding up of the survivors, so the control of rabies must be maintained or it would soon resume its spread and destruction.

POISONING OF PREDATORY ANIMALS.

Mr. ANDERSON. Is this poison work carried on by hunters or do you have a separate force?

Dr. NELSON. No; by the hunters, who are trained in both kinds of work. We are having excellent success in getting the stockmen to cooperate on a considerable scale. They provide sheep herders or cowboys, who, on a certain date, will meet and put out poisoned baits systematically, under the supervision of our experts. The old animals needed for bait stations are supplied by these men. Successful poisoning requires great skill and care in preparing and laying the baits. Some idea of how successful this work can be is shown by an instance in northern Arizona, where one of our men stayed a month guiding cooperating sheep men in a poisoning campaign. During this time more than 300 dead coyotes were found, and many must have been overlooked.

In another section of the same region two of our men were by themselves, and in about 20 days poisoned and found 94 dead coyotes. It is impossible to get anything like such results in trapping.

Twenty trappers might have failed to get such results. The stockmen are becoming greatly interested in this development of the poisoning work, which appears to indicate a method of greatly reducing the losses from these pests.

As a result of this poisoning campaign we have many reports from sheep men as to its effectiveness. One states that for the last two years he has run his sheep on an open range and has reduced the number of his herders, permitting the sheep to scatter, and has had no losses. That means that the coyotes have been practically exterminated in that district. Naturally, if the work is not continued these cleared areas would become reinfested.

In the case of predatory animals and rodents of all kinds, the number of young born is greatly influenced by the food supply. A rat, for instance, that will have three or four young during a time of scarcity of food, will in time of plenty have 12 or 15. Some mice breed every three weeks or so, thus increasing with amazing rapidity.

We get estimates from the cooperating farmers and stock men regarding the savings that have been made through the rodent and predatory animal work. These estimates at the present time indicate that there has been a gross saving of about $73,000,000. For the year 1920 the estimates turned in show a saving of about $13,000,000,

EXTERMINATION OF RATS.

In addition to the general rodent work, we are doing educational work in connection with the control of losses from house rats by helping organize campaigns in different parts of the country and in distributing publications and information.

Mr. LEE. Have you ever had an estimate made as to the loss occasioned by barn rats?

Dr. NELSON. Yes; the estimated loss is about $200,000,000. Some years ago here in Washington we had a man out, an expert, who went, I think, to hundreds of business houses and other people to get a statement of losses from rats. Then we got statements elsewhere on a large scale. It was rather interesting that our estimate of annual losses due to the rat approximated the losses estimated by the English after an investigation by them. Our inquiry showed at least as many rats as people in this country. Taking it at that figure, with the loss which worked out as about $2 per rat per year, we had a total of $200,000,000. The English for some years have been making a study of the house rat and a big drive to eliminate as much as possible of the losses from him. It is significant that their estimate of the individual losses per rat came so near our own.

Mr. LEE. Have you a bulletin on that?

Dr. NELSON. Yes; to show the losses through predatory animals it may be stated that in 1919, 445 stockmen in Arizona reported, in writing, losses amounting to $378,151 in that State.

INVESTIGATION OF POISONS AND POISONING METHODS.

In Denver we have established a laboratory for the investigation of poisons and poisoning methods for predatory animals and rodents and the preparation of poisons for such purpose on a large scale. Predatory animals and some rodents have a sensitive taste and often if they get the slightest strange flavor on their tongues when they bite the bait, they will drop it.

Two experts are working in the laboratory and will extend their experiments in the field on a large scale.

Not only must the poisons and baits be right but the proper technique is necessary in placing them; in other words, studying the psychology of the animal and learning how to make up and place the bait in such way that the animal will not be suspicious. A great many men try to poison them and fail at it simply because they fail to appreciate the fact that experienced animals have considerable reasoning powers, and unless a thing appears perfectly natural they will go around it and avoid it.

STATEMENT OF LOSSES INFLICTED BY INDIVIDUAL PREDATORY ANIMALS.

I have here a few items that may be of interest to you about certain predatory animals our men have killed and the losses from such animals. At Custer, S. Dak., after a six months' campaign, one of the hunters killed a notorious stock-killing wolf which had been running there about 12 years. He made a standing bounty on him of $500 that no one had been able to collect. The cattlemen reported that this wolf had destroyed about $25,000 worth of live stock.

At Split Rock, Wyo., a pack of wolves which the hunters cleaned up had made a record of about $20,000 worth of stock killed.

At Pryor Creek, Mont., a wolf killed in September had killed 150 head of horses, colts, and cows in the last six years.

Another wolf, killed near Pueblo, Col., was reported to have killed $6,000 worth of cattle on one ranch and was estimated to have killed $25,000 worth in all. He was the last of a pack of five wolves that were exterminated.

At Kingman, Ariz., a wolf was killed that had a record of 60 purebred cattle during the previous year.

In southern New Mexico a wolf was killed that in 10 months had a record of 125 cattle.

Whenever we hear of wolves of that kind we put expert wolf hunters on their trail and tell them to get that wolf. The hunter stays with that wolf, studies his habits, and eventually gets him, as in the case of the wolf in South Dakota that had been running for 12 years and had killed $25,000 worth of stock, and which the local hunters had practically given up. A number of our hunters do extraordinary things. One hunter in southeastern Idaho was told that the report was out that a pack of eight wolves had come in from Wyoming and was told to go out and see what he could do. Taking his snowshoes, pack, and gun he went after them. He found the trail of the wolves through the woods and followed it on snowshoes until he had shot and killed seven, one after the other, and wounded the eighth. That one, trying to escape, ran near another hunter who killed him. That hunter simply walked down and killed those wolves. He camped wherever night overtook him and at daybreak took up the trail again, never stopping until he cleaned up the pack. That was done in winter with heavy snow on the ground and severe temperatures.

Mountain lions are also exceedingly destructive. One ranchman in central Arizona reported that he had found 50 calves and three colts killed on his range by mountain lions in one year. We have great numbers of similar records. Our plan is to specialize on these most destructive animals and the method has been so effective that western States have nearly all abolished their bounty laws and are adopting this system.

EXTRACTS FROM LETTERS OF PERSONS BENEFITED BY THE CAMPAIGN AGAINST PREDATORY ANIMALS.

One man writing from Oklahoma says: "I am writing you in regard to how much good has been done in our vicinity by the wolf trappers. Before they came here and trapped the wolves we could not raise one-tenth of our pigs for the wolves and bobcats, and the wolves got at least two-thirds of our young calves. Goats and sheep were impossible."

An Arkansas man writes: "Wolves and other predatory animals have caused great economic losses from their depredations upon sheep, cattle, poultry, killing, in some instances, many animals in one night. The people there have tried in every possible way they could think of themselves to eradicate these animals, without calling on the department, but without success."

Another man writes from Bluffton, Ark., and says: "I desire to say that in my neighborhood in Yell County, during the last year wolves have destroyed about 500 pigs, over 200 sheep and some 300 goats, and in addition to this about 200 yearling calves." He says that he understands loss was also sustained in Perry and Montgomery Counties.

Mr. ANDERSON. Are those cases where your men have gone out?

Dr. NELSON. Yes. We have gotten many grateful letters from these people for what we have done.

The ordinary person is curiously helpless in dealing with these animals because he does not know their habits. The secret of being successful is knowing the habits and being able to outwit them.

The people of Missouri also tell us of great losses.

A Louisiana man writes that several thousand head of sheep and lambs and also young calves have been destroyed by these animals (wolves) in the last few months, and that it has happened yearly since he came to this section. He says there have been large numbers who have approached him on this subject, and that he is writing in order to give all the information he can so that we can aid in securing the necessary funds to stamp out these animals.

Mr. LEE. Do they have wolves in Louisiana?

Dr. NELSON. Yes.

In northern Michigan, the manager of the Upper Peninsula Development Bureau, in Saginaw, writes that they have for years carried on a campaign to get western sheepmen into the Upper Peninsula to take advantage of the excellent pasture they have on their cut-over land. He says that they suceeded in locating quite a number of western sheepmen with them and the first year they had no complaints of loss of lambs or sheep. During the spring of 1920, however, numerous complaints came in from all sections of the Upper Peninsula.

J. W. Carley, at Limestone, lost 75 out of 400 sheep.

Barber & Casabonne lost from two herds at Benton and Sidnaw, Houghton County, 450 sheep and 900 lambs in 1920, out of 5,000 sheep.

In Michigan they have repealed their bounty laws and they are spendng about $30,000 on this predatory animal work. We have one of out best experts in there. He has already trained 23 deputy game wardens in the work. They are beginning to get results. If we had enough money we would undoubtedly do something in the other States.

The State game warden of Minnesota has just written in asking if we can not help to do something to reduce losses from wolves in northern Minnesota.

Mr. ANDERSON. You are asking for an increase of approximately $37,000?

Dr. NELSON. Yes, that sum is desired to use wholly in increasing our work in the control of predatory animals and rodents. We are getting constant and insistent requests for help and have constantly to write that we can not do anything; that we have no money. With this increase of $37,740 we shall be able to allot it so to fill up the gaps in our predatory and rodent work and help meet the most urgent demands which are becoming exceedingly embarrassing. It is difficult to make people understand why, if we have men in one section, we can not supply them elswhere. The situation is especially difficult if the people ask merely for someone to show them how to do the work themselves. This increase is to enable us to properly handle the regular work.

INVESTIGATIONS AND EXPERIMENTS IN ECONOMIC ORNITHOLOGY.

Under this appropriation we are carrying on two other activities, one to assist the fur-farming industry and the other investigations and experiments in economic orinthology. This includes studies of the food habits of useful insect-eating birds and of the habits and methods of control for injurious birds doing damage to crops and fruits. Some birds existing in large numbers are exceedingly destructive. We are working to develop methods to stop their destructive work. An extremely difficult problem now in hand is to control the ravages of enormous flocks of blackbirds in the Imperial Valley in southern California. They go into the fields of grain and clean them out. In the fall I saw a field of 160 acres of milo maize that had not been cut as the blackbirds had gathered the grain in the entire field.

One of our best experts is trying to work out a method to handle that problem, so far without success. There is a possibility that we may be able to use poison gas to get them in their resting places. We are working in cooperation with the Chemical Warfare Service and may possibly develop the use of some gas in rodent and injurious-bird control.

In Oklahoma thousands of crows have become exceedingly destructive.

In Colorado the pinyon jay gathers in great flocks containing from hundreds to thousands of birds after the breeding season. They swoop down on a corn or grain field and in a short time cause very severe losses. We had many complaints and their control appeared very difficult, but our representative found it was feasible to poison them on a great scale. We are investigating also the food habits and the distribution of food plants of wild fowl in connection with the stocking and betterment of water areas where wild fowl live, so that the game supply can be maintained.

Certain other birds are destroying fish on a large scale, particularly in the trout streams and in the salmon waters of the North.

The robin, which is now absolutely protected under the migratory bird treaty act, has become so numerous that in some places it is becoming a pest, especially to the growers of small fruit. Formerly the robin in some sections was killed as game, but, this being ended, it has increased greatly in number. The result is that the natural food supply is becoming limited and the bird turns to cultivated crops.

Mr. **Lee**. The robin is a songbird in the North, is it not?

Dr. **Nelson**. Yes, he is one of the favored songsters.

Mr. **Lee**. I never heard one singing in the South.

Dr. **Nelson**. He is a beautiful singer and many people are very fond of him.

Mr. **Lee**. He probably hears the mocking bird down in the South and is ashamed.

Dr. **Nelson**. That may be.

FUR-FARMING INVESTIGATIONS.

Mr. ANDERSON. What are you doing with respect to the fur-bearing item?

Dr. NELSON. We have an experimental fur farm up in northern New York, in the edge of the Adirondacks, where trained men are investigating the parasites, and diseases, of fur-bearing animals; also methods of feeding and of managing the animals in confinement. Much valuable information useful to the industry has been secured. Although new, this industry is rapidly developing and, as in the case of any other new industry, there is a lack of information available to the general public.

In the spring of 1921 there were 340 black-fox farms in the United States on which were 4,350 black foxes. That represented an investment of approximately $4,280,000.

The number of foxes has naturally increased, and a large number of new foxes have been brought in from Canada. There are now unquestionably well over $5,000,000 invested in this industry in the United States. The general fur business is more extensive probably than people generally appreciate. In 1920 the imports of undressed furs in the United States were over $84,000,000. Dressed fur garments imported amounted to over $9,000,000. The dyers and dressers of furs in the United States handled $52,000,000 of furs, and the Government received in revenue from furs more than $15,000,000. The export of furs and fur manufactures amounted to more than $32,000,000, and the turnover in the fur business in the United States for the year 1920 was over $352,000,000.

The fur-bearing animals, owing to the occupation of the wilder parts of the world, naturally are decreasing in number, and the demand, with the increase of population, is increasing, so that there is an obvious opening for successful fur farming to supply this demand. It is an attractive business and one in which a considerable number of people are becoming very much interested.

Mr. ANDERSON. Are you getting hold of the diseases?

Dr. NELSON. Our men are making distinct progress in that and in control of the parasites. Such work is difficult and has taken quite a lot of experimenting.

One interesting development is that although the fox and the dog are related animals, certain medicines have different effects on them. It is evident, therefore, that the same treatment can not be safely used on the two animals until carefully tested. What may be used with success on a dog may prove fatal to a fox. There is a need for bacteriological and microscopic work and detailed study, all of which will prove of the utmost value to the people in the industry.

Mr. ANDERSON. Do these fur farms raise anything except foxes?

Dr. NELSON. Black and silver foxes are the main things, but they are raising some skunks, raccoons, and a few others, but up to the present time I do not know of anything but foxes that has been demonstrated as commercially a success. The cost of maintaining any fur-bearing animals is considerable and it is obvious that the cost of rearing low-priced skins would be too great.

The average black foxes during the year 1921 brought at auction about $150 each, while silver foxes averaged about $175 each. Extra quality animals sold at private sale ran much higher, up to $1,200 or more it is claimed. The quality varies, and that is one of the things we are trying to get the people to take into consideration. We are trying to educate the fox farmers so they will pay more attention than they have paid to the quality of the animals. To the ordinary farmer when he first goes into the business a black fox is just a black fox. In other words, he may not know a scrub from a good animal as his education has not reached that point. There are many scrub foxes on fox farms in the country. We are trying to develop a general appreciation of that fact and thus bring about an improvement in the quality of the breeding stock. Of course, many of the better-informed farmers are aware of that fact and are working to that end, but many have gone into the business because they have heard about big profits and have yet to learn such details.

Mr. LEE. Do they raise them in artificial caves?

Dr. NELSON. No; in wire pens within which are artificial dens for them to go into.

Is there anything more about the fox business that you care to ask?

Mr. LEE. I think not.

These photographs show two types of foxes. This is what is termed a silver fox, of the type that might bring anywhere from $1,000 to $1,500. This other one is the black fox. These last have become cheaper within a few years, because they can be imitated so easily by dyeing red foxes black. They will only bring a fraction of what a skin like the fine silver gray animal will bring.

Mr. LEE. At what age do they sell these, Doctor?

Dr. NELSON. The young born in spring are grown, and the skin becomes ready to market early the following winter. I have here some skins of notorious wolves. This is what they called "Old Cushion Foot." That fellow was accountable for killing about $10,000 worth of live stock. This other one is the skin of probably the most notorious wolf that has been in the West for years. It is from Custer, S. Dak. The cattlemen where it lived estimated that in 12 years it killed about $25,000 worth of live stock. They had a bounty on him of $500 for years, and the hunters of that whole region tried but failed to get him until our man was put on his trail.

Mr. MAGEE. Is that a timber wolf?

Dr. NELSON. He is both a timber and a plains wolf in the middle and northern Rocky Mountain region.

Mr. LEE. I thought they were darker in color.

Dr. NELSON. Not the plains wolf [indicating]. The wolves in Louisiana and the forest country of Michigan and eastern Canada are darker, but the Rocky Mountain animals are paler. These big wolves when alone at times will wear out a steer, throw him, make a meal from between the hind legs or elsewhere, and then go away leaving the victim alive, sometimes to survive and sometimes to die a lingering death.

Mr. ANDERSON. Is there anything further on that item, Dr. Nelson?

Dr. NELSON. I think I have gone into it pretty thoroughly, but I might refer to a letter which just came in from the director of public health in Washington in regard to an outbreak of rabies which began a few months ago in eastern Washington and seems to be gathering strength. He says that the State has no funds available for the work, and he is asking us to help. We are in this same situation, being without funds unless we take it away from some one else. That is the kind of thing we hope to be able to remedy with the increase, as it will help us meet such demands.

Mr. **Magee**. Are some of these wolves so prominent individually that they give them particular names?

Dr. **Nelson**. I suppose our men have killed more than 20 wolves that have local names, one of them was "Old Two Toes." He had been in a trap and had only two toes left on one foot, so his presence in a district could be made certain. Whenever a dead animal was found they would look for the tracks, and if they found that particular track it would indicate the animal that killed it. This skin is of "Old Cushion Foot," as he was called. He had lost all his claws on one foot so it looks like a pad and made a track like a small cushion. That particular track gave him away by every animal he killed. It is by such distinctive tracks that the guilt has been fixed on many of the worst stock killers.

BIOLOGICAL INVESTIGATIONS.

The next item is that of biological investigations. This covers the technical and scientific section of our work which is essential to the progress of the practical activities.

There are about 1,200 kinds of birds in the United States, and approximately 2,000 different kinds of mammals. It is necessary to have an accurate acientific knowledge of the different species and their habits and distributions, in order that we can work out and determine the useful kinds from the harmful. The results of these scientific investigations are of the utmost value not only to the Biological Survey but are being drawn upon constantly by other departments of the Government, by State and other officials, institutions, and individuals throughout the country.

We are conducting a biological survey of the various States, to determine the distribution of the bird and mammal life, according to the climatic zones. All know that certain kinds of trees grow under certain climatic conditions, but it has been found that the same is true of certain kinds of mammals and birds. The mapping of these climatic zones is proving of extreme value and interest. In addition we are mapping the distribution of the species and are building information files on our wild life not equaled anywhere in the world. We are not asking for any increase under this item.

ENFORCEMENT OF MIGRATORY-BIRD TREATY ACT.

Mr. **Anderson**. Take up the next item, on page 162.

Dr. **Nelson**. This is for the enforcement of the migratory-bird treaty act, which protects birds migrating between the United States and Canada, and also the Lacey Act, which is to prevent illegal interstate traffic in game and wild animals, the inspection of birds and wild animals imported.

Under the present appropriation we have only 28 wardens in the entire United States. In 23 States we have no warden service at all to enforce this act. The appropriation is inadequate to properly enforce the law, and we are embarrassed very much. The violations of the law are increasing. Many people who are willing to violate the law have learned the fact that we lack wardens in many of the States, and even in States where we have one warden it is impossible for him to get around enough to adequately enforce the law. The outcome is that illegal killing and illegal traffic in migratory birds is increasing. We trust that there may be some relief in the not distant future, in order that we can handle this law to better advantage. We are doing the best we can, and have received the hearty cooperation of the States, which are doing much in cooperation.

With our 28 full-paid wardens we have about 400 deputy wardens, who are nearly all deputy State game wardens, appointed on the recommendation of the State game warden. Naturally they can not get out and do very much, but do supply much useful information. Temporarily for special cases some of these men are employed at $3.50 a day and expenses.

Mr. ANDERSON. Do you do any research work under this item?

Dr. NELSON. Yes, sir; a limited amount of it. Bird banding is one line of research. We put numbered aluminum bands on the legs of birds, bearing the address of the Biological Survey. The number of the band, kind of bird, locality, and date are registered in each case and when the bird is killed or captured at a later date the band is sent in to us by mail.

We have one man devoting a large part of his time to conducting that investigation, but the main part of the work is being done by volunteers.

Bird banding is done to gather definite information as to the directions the birds travel in passing from one place to another, the rate of travel, and other facts. We are obtaining some very interesting and valuable information, and hope to be able later to send men up into the wild-fowl breeding ground in northern Canada and Alaska to band birds there so as to learn where birds bred there pass their winters.

Mr. ANDERSON. How do they catch them to band them?

Dr. NELSON. Up in the breeding grounds they get the young birds before they have their flight feathers. The old geese moult their wing feathers and are unable to fly for a period after the young are pretty well grown. They gather on ponds, and we expect to catch them at that time. Large numbers of ducks and of smaller birds are caught in nets and traps.

Mr. ANDERSON. Where do they catch them again?

Dr. NELSON. The migratory wild fowl are usually shot, but small birds are baited and caught in traps.

Mr. MAGEE. Nets?

Dr. NELSON. Yes, sir. For wild fowl they have traps with a net set with a spring released by a string which is pulled when the birds go in to feed and the net is thrown over them. Sometimes they get 30 or 40 ducks at a time in that way.

When these bands are found, the finder mails them in to us. We have them coming in from various places. One band came in from the mouth of a river in West Africa. It was put on in New England. The bird was found floating dead in the mouth of the river.

Mr. MAGEE. How do you suppose the bird got over there?

Dr. NELSON. It was a sea swallow, a bird similar to a small gull, and must have flown. The Negro who picked it up took it to a trader who happened to be there, and he sent it back.

Another band was found down at Trinidad, in the West Indies. We got some extraordinary results from ducks banded on the Bear River marshes in the Salt Lake Valley. One was taken in California.

It must have flown over the Sierra Nevada Mountains. Another was taken in Kansas, another in Arizona, and another in Alberta. They flew to the four points of the compass from that center. One went east over the Rockies, one went west across the Sierra Nevadas. Heretofore we always supposed these birds were flying north and south. That opened up quite a new idea about the movement of wild fowl.

It indicates the invaluable fact that whatever you do to increase wild fowl in one section of the country is likely to help the supply in other sections, whether East, West, North, or South. Unexpected practical results are a common outcome of scientific investigations. The Biological Survey itself offers a good example. It began purely scientific research into the birds and mammals of the United States and has developed from this work a practical aspect of enormous value to the farmers and stock growers of the country; yet nothing of the kind was in view when the work was initiated.

The administration of the migratory bird treaty act, while restricted owing to the lack of funds, has been effective enough through the stopping of spring shooting and of the marketing of birds that year after year we receive reports of constantly increasing numbers of wild fowl. It is commonly admitted that the migratory bird treaty act has been one of the most successful conservation measures that was ever passed by Congress, as its results are obvious.

Furthermore, wild fowl are breeding in many parts of the United States in which they could not breed before because of the spring shooting. Birds could not stop on ponds to breed, for they were certain to be killed. The result was that we had eliminated wildfowl breeding over much of the United States. Since the stopping of spring shooting we receive letters from all over the country saying that birds are coming back and are breeding again in considerable numbers in many of the States, even as far south as Missouri. This is proof enough that the law has been very successful and obviously effective in the conservation of our formerly rapidly decreasing wild fowl.

Mr. ANDERSON. How many wardens do you think you ought to have?

Dr. NELSON. We ought to have at least one in every State and from two to five wardens in the big States. In a State with such a great territory as Texas we might need eight men, as vast numbers of wild fowl winter there.

Mr. BUCHANAN. Do you say Texas hasn't a good game law?

Dr. NELSON. No; merely that it has not provided for the thorough enforcement of the law in such a large State.

Mr. BUCHANAN. Do you mean the administration of it?

Dr. NELSON. I mean the lack of enough paid wardens to cover the State thoroughly.

Mr. BUCHANAN. Not enough employees to enforce it?

Dr. NELSON. Yes, sir. I am not criticizing Texas, but that is a fact.

Mr. BUCHANAN. I thought she had a very good game law. I did not mean the enforcement feature.

Dr. **Nelson**. The game law itself is all right. It has been made to agree with the Federal migratory bird treaty act, and is otherwise up to date. Furthermore, the game officials have given us the most friendly cooperation so far as their numbers would permit.

Mr. **Buchanan**. Is it your idea that in each of these cases where a law is enacted that places upon your department the administration of that law, and that your department should have a complete force to enforce that particular statute, when we have a Department of Justice with a complete personnel?

Dr. **Nelson**. The Department of Justice could not very well enforce this law, because it requires men of special training under constant expert supervision. Furthermore, we are securing more observance of the law through educational methods than we do by police work. A large part of the enforcement of the migratory bird treaty act is done in that way.

Mr. **Buchanan**. If you are depending upon education to enforce it, I fear you are depending upon a broken reed.

Dr. **Nelson**. We have found a large number of people who were violently opposed to this law in the beginning who have become very strong for it since. We have letters from a great many to the effect that they did not believe in it at first, but have since learned that is is a beneficial law and now approve of it.

Almost all the game officials of the States are working in harmony with us in this administration, but they have their own work to attend to, and in some of the States the warden service is limited, so that it is essential that we have more men to work with the State officials. A strong desire for more Federal wardens has been expressed by many State officials.

We have no desire to have a large number of men in any State, but merely from one to half a dozen or so, to be able to reasonably cover the territory each season. The State warden service in some cases includes more than 100 men.

Mr. **Magee**. I suppose, in the main, birds fly north and south?

Dr. **Nelson**. Yes; in a general way.

Mr. **Magee**. Mr. Wason wants to know the average pay of a warden.

Dr. **Nelson**. They get from $1,500 to $2,100. The average is $1,800.

FOR INVESTIGATIONS, ETC., REINDEER INDUSTRY IN ALASKA.

Mr. **Anderson**. There is nothing more on this item; we will take up the next item, on page 164, "For investigations, experiments, and demonstrations for the welfare, improvement, and increase of the reindeer industry in Alaska," etc. That is an item we have had for a couple of years, I think.

Dr. **Nelson**. Yes. The Bureau of Education in 1892, and from then on to 1902, imported into Alaska a total of 1,280 reindeer, which have increased to somewhere from 130,000 to 150,000 at the present time. It has been estimated that there were more than that, but the estimates were vague and probably too large.

Mr. **Anderson**. I thought you had some figures last year that there were somewhere in the neighborhood of 400,000?

Dr. **Nelson**. I think I placed the number around 200,000. That was the statement that had been made to us, and it was accepted.

Our men who have been investigating the reindeer herds for more than a year report that the number is not as great as has been previously estimated. Their opinion is based on actual counts of some herds and the statements of individual owners.

This appropriation was made for the purpose of conducting investigations of the diseases and parasites of Alaska reindeer and of the grazing conditions and herd management. The reindeer industry in Alaska has been growing rapidly for some years, but no information was available for the control of diseases and parasites and the herds were showing the need of attention on this account. In addition, difficulties were developing in relation to grazing and in some sections the herds were beginning to interfere. Most of the reindeer belong to the Eskimo and the Bureau of Education, but white men are entering the business, and from 35,000 to 50,000 now belong to them. It became obvious that something should be done to help build up the industry by giving it the benefit of modern scientific knowledge such as is available to the ordinary live-stock industry.

I accompanied our experts to Alaska a year ago last July and located an experimental station on the coast, in a reindeer center. The first year they traveled on foot and by dog sled over great distances, studying the herds, and last spring a small power schooner was purchased with which they have visited the coast north to beyond the Arctic Circle. They have accomplished an extraordinarily fine piece of work, the results of which will be of the greatest value to the industry. They have been in Washington several months preparing a preliminary report which has recently been completed, and I hope it will be published in the near future. Work of this character usually requires considerable time to get results for practical application, but in this the findings on the ground were so evident that the herd owners before the end of the first year began to change their methods in several respects and the beneficial results are already becoming apparent.

Our men have learned much about reindeer parasites and method of treating and preventing them, about methods of handling the reindeer herds, and about the grazing situation. Herteofore there has been considerable unnecessary loss of reindeer through careless and rough handling. It will be necessary in the near future to allot definite grazing areas to different herds, in order to prevent a chaotic situation arising that will be detrimental to all concerned. At the present time in some districts the herds are interfering. Much care must be exercised to safeguard the interests of the native herd owners. Under present conditions there is much loss, especially from small herds, through straying. I saw one herd of 500 steers that had been driven several hundred miles across country to St. Michael on the coast. That herd of steers had accumulated quite a crop of calves on the way.

Mr. BUCHANAN. Does not that business all belong to private owners?

Dr. NELSON. Yes; nearly all, but that includes the Eskimo owners who have nearly three-fourths of all the reindeer. The white men own only one-fourth, or at most one-third, of them.

Mr. BUCHANAN. Are they tame?

Dr. NELSON. They are nearly as tame as sheep, and sheep dogs are used in handling the herds. Two men and a couple of dogs can handle a small herd of 500 animals but in large herds containing several thousand the requirements are for about one man and a dog for every 500 animals.

Mr. **Buchanan**. Is all of Alaska suitable for reindeer.

Dr. **Nelson**. No, sir.

Mr. **Buchanan**. About what proportion is suitable for reindeer?

Dr. **Nelson**. Approximately one-fourth, possibly one-third, of the total area. The clearest idea can be had from this map. The blue and red areas are the reindeer country. The blue is occupied now, and the red is unoccupied.

Mr. **Buchanan**. They have about half as many there as can be there?

Dr. **Nelson**. No, sir. I think there is room in Alaska for somewhere between three and four million reindeer. Estimates have been made that there was room for from ten to twelve million, but that is impossible. Such an estimate must have been made without any careful study of the situation.

Mr. **Anderson**. We may find that Alaska is useful for something besides minerals.

Dr. **Nelson**. I think there is no question but that there is a great future for the reindeer business in Alaska. The available forage is there to maintain more than 3,000,000 animals, and they breed very rapidly. At an age of 2 years the does commonly have young. The annual increase runs from 25 to 33 per cent.

Mr. **Buchanan**. They have just one calf, like cattle?

Dr. **Nelson**. Yes, sir; they rarely have two. A small amount of reindeer meat is being shipped to Seattle and sold in various parts of the country each year. Inside of 20 years Alaska should be exporting reindeer meat on the scale that will net a greater return than she gets from her gold output.

Mr. **Buchanan**. I wonder if we will not have some opposition by some cattlemen?

Dr. **Nelson**. I doubt it, the decrease of our stock ranges and the increased demand for meat from a growing population will be great enough to take care of that.

One of the observations of our expert in animal parasites showed the practical bearing of the work. He found a herd of several thousand reindeer which had run on a certain range for 10 years. When they killed some of these animals for meat they were discovered to be heavily infested with parasites of six or seven different kinds. Following up this situation he learned that the reindeer had been held so long on the same ground that it had become thoroughly contaminated with parasites thus constantly reinfesting the animals.

Later a herd of several hundred reindeer were driven in from a district where they had worked freely over open range and when killed they proved to be practically free from parasites.

That was a good illustration of the fact that by holding animals closely on a range for a long time the range and the herd would become heavily infested with parasites, while giving them an open range and changing them from one area to another at intervals will to a considerable extent prevent infection.

The attention of the reindeer people owning the infested herd was called to this situation and they saw the point at once, although they never had appreciated it before, and began to rearrange their herd management to overcome this trouble.

It was found that the reindeer were being handled in a crude, rough way that resulted in many being injured or killed. The practice had been to rope the animals to earmark them. The fawns grow horns 8 to 12 inches long the first season, and when the rope is thrown on them and the animal tries to break away the horn may be pulled out with a piece of the skull, thus causing its death. Such accidents are common.

Through rough handling the animals' legs and horns were often broken and they were otherwise injured. Using this method sometimes weeks were required to mark a herd. Experiments in using a corral were tried by the Lomen Co., American herd owners. Narrow runways, chutes, and wing gates were used and it was found they could handle in three or four days as many as they could handle under the old methods in that number of weeks and without the former serious loss.

The methods of castrating were equally crude and resulted in crippling and killing many. We introduced the emasculator, an instrument for doing this work, and it has been a satisfaction to note the readiness with which the herd owners have adopted it. Instead of opposing new and improved methods the Eskimo and Lapps have shown great readiness in their adoption.

This is very encouraging, because it shows it is not going to be difficult to reform their methods of handling the reindeer and getting better results.

The Lomen Co. has put in four small refrigerating plants at different points on the coast, to which they drive the reindeer to be slaughtered, the carcasses cooled and shipped by steamer to Seattle. People conceive Alaska as being a very remote and difficult country to live in, but it is not by any means so bad. I think there is no question but what the reindeer business will eventually yield Alaska a permanent income which, if not equal to the fishery output, will be a close second. It will be a big, permanent, substantial industry for the Territory.

Mr. ANDERSON. Are they finding a market for their output without difficulty?

Dr. NELSON. Yes, sir. They have sent only a few thousand carcasses down, but they last winter were getting 40 cents a pound wholesale for the meat, and it sold at all the larger cities of the United States. Such high prices can not be maintained, but it is a fine quality of meat and it will to a certain extent take the place of game. It has been looked on as game and sold at game-meat prices. The average carcass of an Alaska reindeer weighs about 150 pounds.

Mr. ANDERSON. Dressed?

Dr. NELSON. Dressed, with the skin on. They ship them with the skins on.

Up to the time we began our reindeer work the herds had been handled in a primitive way with practically no expert supervision. The result was that cripples and scrubs are bred as freely as the best stock which unavoidably caused deterioration in the quality of the herd. We are trying to teach the herd owners that they ought to kill the scrub females, and make steer of the scrub males, and breed up their stock for size and quality. The wild caribou in certain sections of Alaska weigh dressed between 250 and 400 pounds. We plan to capture some of those and put with a chosen reindeer herd and begin an experiment in breeding up that will, I believe, result in nearly or quite doubling the dressed weight of the reindeer.

Mr. **Anderson**. Have any of those caribou been brought down yet?

Dr. **Nelson**. No, sir. We have had a man studying the caribou for the last year and he is still at work. We have located caribou areas where they can be caught. We hope to begin this experiment on a moderate scale the coming fiscal year provided our appropriation for this work is continued.

Young caribou tame very quickly and become quickly attached to man. Last year a man near Fairbanks caught a young caribou which after a few days followed him around like a dog. I have other information indicating that caribou will not be difficult to utilize in the manner planned. The Lomen Co. herd on Nunivak Island will be a good one for such an experiment in breeding up. We are also trying to have the herd owners kill off the surplus bulls. They now have half bulls and half cows, especially in the Eskimo herds. As a matter of fact, only one bull to every 20 or 25 cows is needed for breeding purposes.

Then there is the very important matter of grazing allotments which will require legislation by Congress, and this will be needed in the near future. The native Eskimo are now the main herd owners and their interests should be protected. The white men are going into the business and unless some organized method of allotting grazing areas is put in operation serious difficulties are certain to arise in which the natives may suffer. There is one case right now where one company spent several thousand dollars in ranch improvements for their herds in an area that is also occupied by native herds.

Mr. **Buchanan**. Is it your idea that ultimately they should be charged pasturage for the use of Government lands?

Dr. **Nelson**. Yes, sir. I do not think it should be done right away, not until the business gets adjusted on a commercial footing, but there is no question in my mind that it should be done later.

Mr **Buchanan**. You feel that will be as profitable as cattle raising?

Dr. **Nelson**. Yes, sir. Reindeer do not require feeding, they graze on the natural forage. The expenses will be a matter of handling the herds.

Mr. **Lee**. Does not the snow cover the ground there?

Dr. **Nelson**. Yes; but the reindeer paw through the snow. They are animals native to high northern climates. They have their young at times on the snow in zero weather and the young come through all right.

Mr. **Anderson**. You are asking for an increase of $15,000?

Dr. **Nelson**. Yes; in this general item, but not to use in the reindeer work; that increase is needed for the better protection of land fur-bearing animals.

I might add here that last year we bought a small 15-ton power schooner to enable our reindeer men to visit the reindeer country along the coast, which extends over hundreds of miles of territory, and the maintenance of this boat is one of the items of expense which will have to be continued.

Mr. **Anderson**. We increased that item $6,500 last year. That was for the powerboat, was it not?

Dr. NELSON. Yes, sir. We are now asking for $15,000 increase in order to add to our warden service in administering the law for the protection of Alaskan land fur bearers. These animals, since 1867, have yielded over $30,000,000 in furs, and in 1920 they yielded over $1,100,000.

Mr. BUCHANAN. What various kinds of animals does it cover?

Dr. NELSON. The principal land fur bearers are the fox, mink, marten, land otter, lynx, ermine, and beaver and muskrat.

Mr. MAGEE. When you referred to the yield, do you mean yield to the Government?

Dr. NELSON. No; their entire value in the market.

Mr. MAGEE. The Government does not get any of that?

Dr. NELSON. Only indirectly; Alaska is a Territory and the Government is responsible for the conservation of its resources. The Government provides for protecting these animals to prevent this natural resource being destroyed, just as it does for the national forests under charge of the Forest Service.

Mr. MAGEE. The Government will eventually get some revenue from it?

Dr. NELSON. Yes, sir; indirectly. We have a power boat at Juneau for patroling the southeast coast and islands of the territory to protect the fur bearers. We need very much five additional wardens, to be placed at different points in the Territory. As Mr. Sutherland says, thieves have begun robbing the fur farms on islands there, which increases the urgency for better warden service. The Forest Service and the Biological Survey each having control of certain islands have issued permits for more than 100 fur farms, mainly for blue, but some for black, foxes. Some fur farmers there are experimenting with marten on some of the islands. So far no one has succeeded with marten elsewhere, and if these experiments are successful it will be a valuable addition to the fur-farming industry.

We have tried marten on our experimental fur farm, and people have tried farming marten in cages without success. On these Alaskan islands the marten are permitted to run free in the forest in natural surroundings but are fed regularly.

Mr. BUCHANAN. How many islands are there up there?

Dr. NELSON. There are hundreds of them. The Aleutian chain is about 800 miles long, a series of islands running westerly from the peninsula of Alaska, others are scattered all along the south coast.

These fur farms have developed well and, where the owners have shown good judgment in taking care of their animals, some of those men have made small fortunes in a very few years. Many fur farmers in Alaska are suffering now from the same troubles as the fur farmers in the United States, a lack of knowledge of the quality of animals they ought to keep on their farms, as to color, texture of fur, size and build of the breeding stock. Many have scrub stock because they do not appreciate the difference. In order to prevent the over killing of land fur bearers in Alaska as provided by law and regulations, it is necessary to exercise vigilance to see that people observe the legal trapping seasons and do not use poison or other illegal methods in taking them. Unless this is done a wasteful killing is certain to occur and this valuable natural resource will be seriously endangered. Alaska is a vast Territory in which with only the present $15,000 available it is an impossible task to get halfway satisfactory results in this protective work. We need five additional wardens exceedingly in order to take care of that situation. We have $15,000 now to police all of Alaska. It should be obvious that with only $15,000 it is absolutely impossible to administer the fur law and get even approximately good results in a Territory the size of Alaska.

Mr. **Buchanan**. With twice that amount would it not also be impossible?

Dr. **Nelson**. It would still be difficult but we could do incomparably better. Alaska has certain commercial centers scattered through the Territory, and by having a fur warden with headquarters at the most important of these centers where the trappers and traders come we would be in a position to know what is going on and to hold down to a great extent the present widespread violations. If we can secure even this inadequate warden force in Alaska, we can certainly do much to help the present situation.

Mr. **Buchanan**. Would five more give you one for each fur center?

Dr. **Nelson**. Yes; it would enable us to place wardens in the main fur centers where we are not now represented. In combination with our present wardens it would be a very great help. We can do a lot of good with it. Here is a natural resource yielding a return of over $1,000,000, which is being jeopardized by inadequate protection. In some large districts they are poisoning fur beavers to the extent that they practically wipe them out. The poisoners get only a part of the animals they poison, a large percentage of the killed animals not being found until the next summer after the snow goes off. We have had reports to this effect from many places. For that reason I hope very much that you will find it possible to grant this requested increase.

This new phase that Mr. Sutherland spoke of, the robbing of those fur farms, is a serious matter. If we had a larger warden service we could help head off inroads of that kind. Their continuance will give a very serious check to the fox-farming industry.

Mr. Chairman do you wish anything further on this item?

Mr. **Anderson**. I think not. You may take the next item.

FOR ADMINISTRATIVE EXPENSES.

Dr. **Nelson**. The next item covers our administrative expenses. We ask the same as for the present year. This is the routine administration work of the bureau. Unless you have some questions I don't think there is anything requiring explanation here.

Mr. **Anderson**. I think we might pass that. Does that complete it?

Dr. **Nelson**. That completes it.

Mr. **Anderson**. You may be excused then.

MONDAY, FEBRUARY 6, 1922.

DIVISION OF ACCOUNTS AND DISBURSEMENTS.

STATEMENT OF MR. A. ZAPPONE, CHIEF OF THE DIVISION OF ACCOUNTS AND DISBURSEMENTS, DEPARTMENT OF AGRICULTURE.

SALARIES.

NEW POSITIONS.

Mr. ANDERSON. We will take up the Division of Accounts and Disbursements.

Mr. ZAPPONE. The Division of Accounts and Disbursements is asking for very little, Mr. Chairman. It is asking for one clerk at $1,600, two at $1,400 each, and one at $1,200. If you will note the appropriations for this division you will see that for six years they have remained practically the same. Last year Congress allowed four additional clerks; this year two, although three were requested. I feel that four additional clerks will be necessary to take care of the work next year.

The steady growth of the regular appropriations of the department and the appropriations provided by special acts imposed so much additional work upon the division that it is almost impossible to pay the accounts promptly with the present force. At times when the work is particularly heavy the bureaus have come to our relief in the way of temporary details, but such details are far from satisfactory because the employees are not experienced in accounting, and I feel that you would prefer me to have an efficient force to look after this important work. We do the overhead in the accounting line for the department, and every new appropriation adds to the work. We can not anticipate the needs. Last year the farmers' seed loan law appropriated $2,000,000. There was no provision in the law for any assistance in Washington at all. All the accounts were paid through my office, and the collections are being made through my office. So you can see how these different special acts add to the division's work. The appropriations for the department have increased greatly, particularly since the fiscal year 1915. The agricultural appropriation act for 1915 carried, in round numbers, about $20,000,000, while special and permanent appropriations brought the total for the department up to about $28,000,000. For 1922 the agricultural bill carries $36,599,259, while permanant appropriations and special funds amount to $11,750,000, making a total of $48,349,259. In addition, $80,000,000 was appropriated by the national highway act for Federal aid to the States in the construction of roads, which, with an unexpended balance of $193,000,000 from former appropriations for Federal aid road construction, and unexpended balances from miscellaneous appropriations for prior years, makes the aggregate amount available to the department for expenditure during the present year about $329,000,000. It is estimated that about 200,000 accounts will be paid during the year, requiring the issuance of approximately 325,000 checks.

AUDITING SYSTEM.

Mr. **Anderson**. I wish you would tell us something about the auditing system down there.

Mr. **Zappone**. In 1912 Congress passed a law providing that the administrative examination of accounts be made in the bureaus, so that the work was transferred from my office, where it was centralized, and placed in the bureaus, and a number of clerks engaged in the work were also transferred with it.

The bureaus make a very careful examination of all accounts. In the case of travel accounts they check up to see that the travel was performed in accordance with the letter of authority that had been issued by the bureau chief; that there was no undue delay in performing the travel, and that the amount expended did not exceed his allotment. In the case of accounts for supplies, they check up to see that the supplies are up to specifications, that the quantity delivered agrees with the quantity ordered, and that the price is in accordance with the requisition. Of course the examination differs with various classes of vouchers. All are, however, given a close administrative examination.

Mr. **Anderson**. After the expenditures have been incurred?

Mr. **Zappone**. After the expenditures have been incurred. In the case of purchases of supplies the issuance of the purchase order is the first act. That goes to the dealer, and on it he furnishes the supplies. The voucher is then submitted directly to the bureau, and the bureau makes the examination. In the case of travel a letter of authorization is first issued, which in a way takes the place of the purchase order. It is an authority to the man to make the trip. At the end of the month he submits his account. The accounts are then scheduled to me for payment. Under the law I am required to give them an examination to see that they represent a legal claim against the appropriation; that is, to see that the appropriation is available for the expenditure and that there is a sufficient balance of the appropriation from which to pay the account. After determining that it is a legal claim, that extensions and additions are correct, and the account has been certified and approved by the bureau chief, a check in payment is issued.

Mr. **Anderson**. In this item of material and equipment, is there any loss incident to making purchases in small amounts? I suppose in making purchases for a bureau the amounts would be smaller than if made for the department as a whole?

Mr. **Zappone**. That is true. The Budget Bureau is endeavoring to bring about centralization, Mr. Chairman. They now have a Chief Coordinator, General Supply, and committees have been appointed in each department. The chairman of each committee is called a purchasing agent. He carefully examines all purchase orders, and if possible to combine them and buy in larger quantities he will send the order back to the bureaus for that purpose. In that way they are accomplishing certain economies. No central purchasing agency has as yet been established in our department, but I have no doubt it will be done in time, perhaps, in each department. They have a central purchasing agent at the present time in the Post Office Department, and I believe the scheme has resulted in considerable economy. While, as stated, such a change is in contemplation, I think, by the Chief Coordinator, General Supply, it will take time to bring it about, particularly in a department like ours, where so many scientific and technical articles are required and where there are so many outlying bureaus which would be far removed from the central purchasing point.

Mr. ANDERSON. Have you any idea what proportion of the supplies are bought in Washington and what proportion in the field?

Mr. ZAPPONE. As to the money value?

Mr. ANDERSON. Yes.

Mr. ZAPPONE. I should say that the purchases both in and out of Washington would not be more than 5 per cent of the appropriation, hardly that.

Mr. ANDERSON. I understood you to say one of the difficulties of centralizing purchasing under one head was that you had so many outlying bureaus. Did you mean field officers?

Mr. ZAPPONE. No, sir; I mean outlying bureaus in the city of Washington. You know our housing conditions are very poor. We have had to rent a good many buildings in the immediate vicinity of the reservation and some far removed, and that will make it more or less difficult to centralize such work.

Mr. ANDERSON. What was the reason for decentralizing the auditing?

Mr. ZAPPONE. It was done by Congress. The present arrangement seems to be working satisfactorily to the bureaus and is very satisfactory to me.

Mr. BUCHANAN. You said you wanted four additional clerks. What class?

Mr. ZAPPONE. One at $1,600, two at $1,400 each, and one at $1,200. They are called classes 3, 2, and 1.

TUESDAY, FEBRUARY 7, 1922.

DIVISION OF PUBLICATIONS.

STATEMENTS OF HON. C. W. PUGSLEY, ASSISTANT SECRETARY OF AGRICULTURE; MR. JOHN L. COBBS, JR., CHIEF OF DIVISIONS OF PUBLICATIONS; AND MR. JOS. W. HISCOX, ASSISTANT IN CHARGE OF EXHIBITS.

GENERAL STATEMENT.

Mr. ANDERSON. We will take up the item on page 168, Division of Publications. The Assistant Secretary will make a preliminary statement with reference to the publication situation in the department.

Mr. PUGSLEY. Mr. Chairman, in discussing the publications of the Department of Agriculture, and the work of the Division of Publications, I am assuming that no distinction shall be made in this preliminary statement concerning the items that are listed on page 168, and the appropriation which is made for publication work in its entirety.

The Department of Agriculture has become, under the appropriations of Congress, the greatest research institution in the world; more important research is conducted here than in any other one governmental or private organization. Probably if we had the actual facts, we would find that from the standpoint of food production, and utilization of farm products, more important discoveries have been made in the Department of Agriculture, and its cooperating agencies, such as the experiment stations, which were started by the Government, than in any other organization, either public or private.

It is necessary, of course, to publish the results of these research workers, no matter whether these results are positive or negative. A series of research investigations which determine that a thing can not be done and giving the reasons why it can not be done is just as important to record and pass on to other research workers as is a series of investigations which give positive results. For that reason it is highly essential that there be a sufficient appropriation to cover the publication of the results of these research workers in three forms, first, in its technical and scientific form in detail for the use of other scientists, both within the department and within other research organizations. We realize that the scientific publications are often not written so that a man who is not versed in technical language can understand them, but they are written in detail so that the research workers can avoid duplicating the efforts of other research workers, and in that way many thousands of dollars are saved to public research institutions.

The method of publishing the scientific work of the department is by means of a series of department bulletins and professional papers.

Here [indicating] is an illustration of one of the department bulletins, and here is one of the professional papers of the department. Then in addition to that some of the highly technical research papers, which need only to be sent to libraries, have been printed in juornal form in the publication known as the "Journal of American Research." The reason for publishing these papers in this form is because that method of publication is more effective and it is cheaper. From two to half a dozen research papers can be published at one time; they can be bound in the libraries when published in serial form, without danger of losing. If these papers were published in separate pamphlets, such as the bulletins which I have just shown you, not coming periodically, they would likely be misplaced in libraries, for there is no convenient beginning or end for binding purposes.

In addition the economy of publication in the form of Journal of Agricultural Research, rather than in separate bulletins, is quite evident. We distribute this only to libraries. It does not go to individual workers, and coming out in the Journal form can be referred to the scientific workers in the various institutions.

Then there is the second class of publication, which has as its function the giving to the public, in popular language, the results of investigations, and our method of distributing that information is by means of farmers' bulletins. [Indicating.] The appropriation bill last year provided specifically that not more than $250,000 should be used for the printing of farmers' bulletins. I think the provision this year, which contains an increase in the total appropriation over last year to the extent of the emergency fund of $125,000, provides $300,000 out of a total of $850,000 for farmers' bulletins. Farmers' bulletins are written for use of the farmers and other people who wish to put into practice the discoveries and determinations of the research workers of the department. They are naturally extensively used by county agents and boys' and girls' club workers. They are used in answering the correspondence that comes in from people who are asking for practical information.

In addition to the publication of farmers' bulletins, it is necessary to carry the information of the work of the department to the press, and that is done by means of press notices going only to editors in the form of a clip sheet and press stories.

If you are interested in these different forms of publication—and I assume you will be when we take up the discussion in detail of the forms of printing—I have samples of them here.

So much for a brief statement of the publication work of the department.

The Division of Publications is the office in the Department of Agriculture which looks after the printing work, as well as some of the closely allied lines of work.

CENTRALIZATION OF DUPLICATING WORK OF THE DEPARTMENT.

Last fall a combination was made within the Division of Publications of all the duplicating work of the various bureaus of the department. There had developed within each bureau a large force of people who were mimeographing and multigraphing the various forms and statements that they needed in carrying out the work of their bureaus. By order of Secretary Wallace these various divisions in the department were centralized in the Division of Publications.

Mr. Cobbs, the chief of the division, tells me that as a result of the combination we are not only doing the work to the better satisfaction of the bureaus, from the standpoint of speed and quality, but have been able to turn back into the general supply committee equipment which is not needed under the concentration plan, amounting to $19,520.42.

In addition, it is quite evident that we will be able to make some saving, perhaps a considerable saving, as time goes on, in the personnel that is used for the operation of these duplicating machines.

In arriving at the estimate of $19,520.42, we used the cost price of the machinery, but the experts of the department say that practically all of this machinery can be put in working form, practically as good as new, for an expenditure not exceeding $750. Other economies which we are working on in the printing work of the department may be summarized briefly as follows:

SAVINGS EFFECTED BY COMBINING OR DISCONTINUING VARIOUS PUBLICATIONS.

Formerly three periodicals were published by three different bureaus in the department. One was the Market Reporter, published by the Bureau of Markets. That was a weekly publication. One was a monthly publication, known as the Monthly Crop Reporter, published by the Bureau of Crop Estimates; and a third was the National Crop, Snow and Ice Bulletin, published by the Weather

Bureau. These three publications have been combined into one publication, known as Weather, Crops, and Markets. The Weekly News Letter, a weekly publication, was formerly published. That was discontinued on December 1 and its place was taken by a house organ, known as The Official Record, with a much smaller circulation. The saving effected by this combination will be apparently a little over $12,000 annually, and we believe the effectiveness of the work is very much increased, because the people interested in weather, crops, and market reports get them in one publication instead of three.

I want to say a word also about a few other serial publications.

The Experiment Station Record is a semimonthly publication, which is in effect a brief of the research publications of the Department of Agriculture and the experiment stations in this country and other countries. All research workers go to this to learn of new research results. It is one of the most useful publications to research workers in the country.

Mr. ANDERSON. What is your list on that now?

Mr. PUGSLEY. The circulation?

Mr. ANDERSON. Yes, sir.

Mr. PUGSLEY. It is printed in an edition of 7,500 copies. It goes to libraries, agricultural colleges, experiment stations, research institutions, and to some of the research workers within the Department of Agriculture and experiment stations and to newspapers making requests for it. There are certain technical newspapers that need this information.

We have discontinued a publication of one of the periodicals which we feel is an important periodical, because the Joint Committee on Printing has not authorized it under their amended rules. That periodical is known as Public Roads. We are not asking for its continuance in its present form; in fact, I rather feel that the form can be changed to the advantage of the department and the workers, but we do feel that the publication is tremendously important. Millions of dollars are appropriated to the Department of Agriculture to spend on roads all over the United States. We are cooperating with the State engineering departments in the spending of this money. We have a research laboratory here to determine the best methods of road construction, and certainly we need some systematic method of carrying inspiration and instruction to the cooperators in the various States. We are publishing, because the Joint Committee says it is a statistical publication and authorized under their rules, a Monthly Weather Review, which contains statistical information different from that contained in Weather, Crops, and Markets, and necessary for the use of the meteorological investigators over the country.

Mr. ANDERSON. That is a permanent historical record?

Mr. PUGSLEY. That is a permanent historical record of the observations of the Weather Bureau, and if the observations are of any value they should be preserved in some permanent form.

We are continuing the publication of the Clip Sheet, which is our only means of sending regularly to the editors of the country brief news stories, and progress reports of the work of the Department of Agriculture. This is an inexpensive form of publication, but is a periodical in the sense that it is published every week. It goes to papers making requests for it, and does not go to individuals. It does not contain extensive writeups, but only an intimation of what has been published by the department, and is available for distribution.

We discontinued on December 1 a publication of the syndicated form of news items known as "Special Information Service." This consisted of two columns of illustrated articles every week, one dealing with production, one with markets and farm management, one with poultry, and one with housekeeping. This goes to 3,000 newspapers that made specific requests. Photographic prints are loaned, and until recently mats were furnished for the use of daily and weekly newspapers. The service was popular, and many of the editors are requesting that if possible we continue the service. You will note that it is not of the same type of service as the Clip Sheet, but contains larger stories. Papers wanting to publish these stories can use the illustrations, which will be sent them upon request. It goes to only those who request it.

Mr. ANDERSON. Are those illustrations furnished in plates?

Mr. PUGSLEY. In prints.

Mr. ANDERSON. They are furnished in prints?

Mr. PUGSLEY. Yes, sir; in photographic prints; formerly we furnished some of them in mats, but that has been discontinued, because of lack of funds.

Mr. ANDERSON. So if a newspaper wants to use the illustrations it has to write for the print and have its own cuts made?

Mr. PUGSLEY. Yes.

Mr. LEE. There will be very little of that done.

Mr. PUGSLEY. Quite a good deal is done by the larger publications, but where mats are not furnished the smaller publications can not use them.

Mr. LEE. The papers that reach the country folks do not contain this?

Mr. PUGSLEY. Farm papers will take the prints and make their own cuts, and they reach the country folks.

Mr. LEE. The average little farmer reads his county paper.

Mr. PUGSLEY. Yes, and this was designed to reach him.

Mr. LEE. That would never reach him.

Mr. PUGSLEY. Oh, yes, it reached him, because this material was syndicated and used on the so-called patent insides or as "boiler plates."

Mr. ANDERSON. As I take it there are very few country newspapers that would use that material in their own print. They will not set that stuff up and print it?

Mr. PUGSLEY. Many of them use it in that form, not the smaller type of country newspaper, but there are a large number of weekly, semiweekly, and daily papers published in towns from 5,000 on up that used this material when available.

Mr. ANDERSON. A good deal more of it would be used if it were furnished in plate?

Mr. PUGSLEY. Yes.

Mr. Chairman, I think that covers briefly the forms of periodicals and the changes that we have recently made.

Mr. Anderson. Are there any essential publications of the department which are not now being printed, under the action of the Joint Committee on Printing?

Mr. Pugsley. We are not now printing Public Roads, which I consider an essential publication, or the Special Information Series, just referred to.

Mr. Lee. What was the reason for discontinuing that publication?

Mr. Pugsley. Because the Joint Committee says it does not come under their amended ruling, which permits the publication of statistical and administrative work only, and it was discontinued because of the clause which was in the bill passed last March 4, requiring the discontinuance of periodicals on December 1, unless they had specific authorization from Congress.

Mr. Lee. I do not know of any publication that people are more interested in than roads. It is most interesting.

Mr. Pugsley. I agree with you. We understood from an informal conversation with members of the joint committee that their ruling intended that we should publish the Journal of Agricultural Research and the Experiment Station Record, and we sent a copy of the Journal of Agricultural Research the first week in January. That was returned with a statement that in the opinion of the Public Printer the Journal of Agricultural Research was a periodical which was stopped on the 1st day of December by law. After that the Secretary and I had a conference with the entire Joint Committee on Printing, and while we arrived at no definite decision in the matter, the opinions which were expressed in that committee were such that we have sent down copy again for the Journal of Agricultural Research We do not know what the result will be. We have also sent down copy for the January number of the Experiment Stations Record. We do not know whether that will be returned or not.

We sent down copy for the House Organ, known as The Official Record. We considered that as an administrative publication. In it we had some personal items, which gave the movements of the people in the Department of Agriculture. Instead of publishing the entire orders, which in many instances would take from one-fourth of a column to half a column each, we summarized them in three or four lines. They returned the personals with the statement that material of that sort was not contemplated in the ruling of the joint committee, that it was neither administrative nor statistical, but they published the rest of the material sent for the Record. The Secretary called the attention of the joint committee to the fact that they would not have raised the question if we had included the entire text of the orders, but when we sent down a brief of the items, more effective and occupying less space, they were not published. The entire printing situation is one of embarrassment to us, because we do not know what we can or can not publish, and we do not seem to have any means of determining beforehand whether we should prepare material or not.

If it is necessary to get specific authorization from Congress for the publication of the periodicals and serials that we consider essential to the work of the Department of Agriculture, it seems to me the proper place for that authorization is in connection with the law that appropriates the money for printing. For that reason, Mr. Chairman, I wish to suggest that there be incorporated in your bill a statement that not more than the necessary amount of money be used for the printing of certain periodicals in the Department of Agriculture, and if you think it is in order, I would be very glad to suggest what the periodicals are and the form it might take in the bill for your consideration.

Mr. ANDERSON. I would be glad to have you do that.

Mr. PUGSLEY. You will note in the appropriation bill that it states that a certain amount of money is to be used for printing and binding. including not to exceed a certain amount for farmers' bulletins. I suggest that the reading of that clause in the appropriation bill be changed to read as follows:

> For printing and binding, including the annual report of the Secretary of Agriculture, as required by the act of January 12, 1895, and in pursuance of joint resolution No. 13, approved March 30, 1906, and also including not to exceed $300,000 for farmers' bulletins, which shall be adapted to the interests of the people of the different sections of the country and equal proportion of four-fifths of which shall be delivered to or sent out under the addressed franks furnished by Senators, Representatives, and Delegates in Congress, as they shall direct; and also including not to exceed $200,000 for a weekly publication giving information with respect to weather, crops, and markets, a semimonthly publication which shall be a record of experiment-station work, a weekly journal of agricultural research, a monthly publication which shall be a review of weather and meteorological investigation, a monthly publication devoted to the building and maintenance of public roads in connection with the administration of the Federal aid road act, a weekly clip carrying brief progress reports and department news to the press, a weekly information service to the press reporting in popular form the results of the investigations of the department, and a weekly official record in the nature of a House organ containing administrative information about the activities of the Department of Agriculture, $850,000.

That is the same amount that was included in the recommendation. Let me add, however, that I believe good administration would be to appropriate the money and make the Secretary responsible for its most effective use without detailed restrictions.

Mr. ANDERSON. Do you want to take up the amount of the appropriation?

Mr. PUGSLEY. The total amount?

Mr. ANDERSON. Yes.

Mr. PUGSLEY. If you desire; yes.

COST OF PRINTING.

Mr. ANDERSON. I would like to ask whether in making that estimate any consideration was given to reductions in the cost of printing?

Mr. PUGSLEY. That matter was up with the Budget Committee, and not only was the matter of reduction in the cost of printing material considered, but also economies which could be effected by these changes I have mentioned. The department feels that the work has been handicapped in times past, because we have not had sufficient money to publish the research work of the department, or a sufficient amount of money to publish popular bulletins to supply the demand of people who actually need and ask for information. The Budget Committee—I think that I am stating no secret when I state this—had intended to cut the appropriation that was asked for 25 per cent. Dr. Ball and I went before the Budget Committee, and after explaining the work of the department, the need of the publication of more of the work, they left the appropriation just as it was, feeling fully satisfied.

I would like to ask Dr. Ball if he will make a statement of the reason why more money can be used to advantage, and particularly why if we have more money available we will have the preparation of certain material which should be prepared, and which has not been prepared because there were no funds available for its publication.

Mr. **Ball**. In visiting the different bureaus of the department and talking with the men about the scientific work, I have been met constantly with a large amount of scientific information of great value, and I say, "why not get it ready for publication," and their answer is, "I have three manuscripts now waiting for publication." There is no use in preparing this. You see if you prepare a scientific manuscript for publication, you must bring the whole discussion up to date. If it lays around for a year or two years it is practically necessary to rewrite it, and include all the information that has been gotten since that time, so the writing of that is left.

So if a man has three bulletins for publication, he is not going to bring out and prepare these others. It is this information that is tied up in this way. You understand, if our information of that kind is withheld, it means that other workers are duplicating that very work. If they had that publication and knew the facts, they would start an investigation of the known facts and go on instead of going over the work this man has done but has not been able to publish. There is a great deal of waste of labor the country over, due to the fact of lack of knowledge of this work that other men have already done.

Mr. **Anderson**. Are there not a good many reasons why the publications are not printed besides lack of funds?

Mr. **Ball**. I do not know.

Mr. **Anderson**. I have been advised that there are quite a number of publications in the bureau which are in various stages of preparation and completion which have not been printed, not because of lack of funds, but because of other information.

Mr. **Ball**. I think that is true. That, however, is not true with respect to the ones that I have discussed. I would not say that we would want to publish everything that is prepared.

Mr. **Pugsley**. I do not know what you have in mind, but for my own information I would like to have a statement of what is on your mind. Maybe it will be of value to me.

Mr. **Ball**. I do not know what is on his mind, but I know what is on mine. Besides, the getting out of research work after it accumulates is bad, and there is another very important piece of work that is the function of the National Government, as against that of the State government, the summarizing and bringing together of all the workers in a given line. For instance, suppose we take the study of the soil. There are probably 40 different agencies in the United States studying on propositions relative to the soil. The soil is connected up with the work of many different lines of investigation. If each individual investigator, when he comes to any part of his problem that involves the question of the relation of the soil, must go and study all the matter that has been printed and derive his own conclusions of the result, there is a tremendous waste of time. If one man, connected with some great library, with proper library facilities, gan get all the material together and summarize and abstract it in the form of a summary of that work, it will save all these other workers that task and will advance the possibility of research tremendously.

Mr. MAGEE. As I understand it, the question of publications of farmers' bulletins is not involved, or is it?

Mr. PUGSLEY. Not in the discussion.

Mr. MAGEE. Congress made an appropriation for farmers' bulletins?

Mr. BALL. They make that mandatory.

Mr. MAGEE. That can be eliminated.

Mr. BALL. Practically so.

Mr. MAGEE. Now, then, the only question which is raised is what publications the Department of Agriculture shall be permitted to publish, or an appropriation made exclusively for farmers' bulletins.

Mr. PUGSLEY. The question before us now is the one asked by Mr. Anderson, of why we need the appropriation asked, is it not?

Mr. MAGEE. What publications you shall be permitted to publish, and the appropriation made?

Mr. BALL. Yes; unless we expend all the money provided for in the farmers' bulletins it will curtail the amount available for others.

Mr. MAGEE. The question of farmers' bulletins is not here. Everybody concedes an appropriation shall be made for that. I want to see what the kernel is. You would desire to publish certain publications from the Department of Agriculture. Your contention is that Congress has not provided the money for the publication.

POWERS OF THE JOINT COMMITTEE ON PRINTING.

What power has the Joint Committee on Printing in reference to governmental publications?

Mr. PUGSLEY. Under general law they are working under a provision which says they shall eliminate or prevent waste, duplication, neglect, and delay in Government printing.

Mr. MAGEE. Is the power with them, as you understand it, to determine what publications you can get out from the Department of Agriculture?

Mr. BALL. Under the proviso in the last year's appropriation bill the serial publications were stopped, and that is the thing they have been exercising on us, but other than that the question we are discussing is the question of their determination.

Mr. MAGEE. I am asking if they have the power to determine?

Mr. PUGSLEY. May I answer in this way? Apparently they feel they have the power, because bulletins are being returned to us, which we feel are necessary for publication, with a statement that this is a duplication or a waste of public funds, and not necessary to be published.

Mr. MAGEE. If Congress gave them power to determine it, it is up to them.

Mr. PUGSLEY. The form of publication?

Mr. MAGEE. If Congress gave them power to determine them, then the question is up to the joint committee.

Mr. BALL. It simply said they shall discontinue all serial publications. The only power they have is the interpretation of what serial publication is.

Mr. **Pugsley**. The law under which they are operating is as follows:

[Public Act No. 314, 65th Cong., approved Mar. 1, 1919.]

Sec. 2. That the Joint Committee on Printing shall have power to adopt and employ such measures as, in its discretion, may be deemed necessary to remedy any neglect, delay, duplication, or waste in the public printing and binding and the distribution of Government publications: *Provided further*, that on and after July 1, 1919, all printing, binding, and blank-book work for Congress, the Executive office, the judiciary, and every executive department, independent office, and establishment of the Government shall be done at the Government Printing Office, except such classes of work as shall be deemed by the Joint Committee on Printing to be urgent or necessary to have done elsewhere than in the District of Columbia for the exclusive use of any field service outside of said District.

Mr. **Magee**. It seems to me that they are clothed with authority to say what is a waste of publication and what is not. They might determine that a certain publication is wasteful.

Mr. **Anderson**. That form of censorship results in destroying the work that has been done upon the research, in getting the material on which the publication was based, and also destroying the work involved in the compilation and editing of the bulletin or periodical, whatever it may be. If the joint committee is going to exercise the power of censorship over these bulletins, and say what shall and shall not be printed, they should put somebody in the department before the work is done rather than afterwards, because there results a waste infinitely greater than would be involved in the printing after the work is done.

Mr. **Magee**. That is the point in my mind. I can see the point made by Dr. Ball. I think you ought to have the power to issue certain important publications. The question in my mind is what steps Congress had taken in the premises, and where the power is.

Mr. **Buchanan**. Is that a permanent law?

Mr. **Pugsley**. Yes, sir; it may be a question of the interpretation of the law whether Congress intended the joint committee to act as a censor of subject matter of publications, or rather to the operation of the Public Printing Office.

Mr. **Magee**. In my judgment it is a regular proposition, and they are clothed with authority, and the idea of Congress was to get rid of unnecessary publications. It does seem to me under that law, from a legal viewpoint, they have the authority—the manner in which they have exercised it is another proposition. I feel that you should have some latitude in these publications, because, as Mr. Lee says, in Public Roads, and other subjects, the people are much interested in them.

Mr. **Pugsley**. May I give an illustration of how the censorship now works? One bulletin was sent down on a disease of sweet potatoes. It contained some colored charts for showing the difference in sound and diseased potatoes. The bulletin was returned with the statement that these charts were unnecessary; that it was a waste of public funds to print them in colors. Mr. Smith, the director of information, with the author of the bulletin, went down to the joint committee with the two potatoes, put them before the members of the committee, and made the point as to why the colored plates were necessary to show the disease and susceptibility to the disease. As soon as they saw the potatoes, and had a brief explanation, they said that it was necessary to the proper distribution of that information.

There was no question raised then, but in the meantime we had sent the manuscript down, it had been returned, and it had taken much valuable time of people at both ends of the line.

Another instance: In 1916 the Department of Agriculture published a bulletin on Hot School Lunches, designed for the use of farmers' wives and mothers of farm children, in preparing lunches for their children to take to school. This was done by the authority of Congress, to do experimental work along the line of home economics, and also under the authority of Congress to do educational work by means of county agents, and home demonstration agents. The bulletin was very popular, and we desired a reprint of it, so the bulletin was revised from later information and sent down for a reprint. It was returned to us with two bulletins from the health department with the statement that the committee could not publish the bulletin because the health department had two bulletins on the same subject.

Our opinion was not even asked, they just returned the requisition with the manuscript. The truth of the matter is that the bulletin of the department was published under two laws. The Department of Agriculture is the only department that is doing research work in home economics. We were asking for a revised reprint, because of the demand. The health department bulletins were published in 1919 and 1920, were written by outside people, and were not based upon research work done by the health department. They were designed for city mothers, rather than farm mothers, so it was no duplication in the first place. Here are two illustrations of the delay and waste which censorship brings on the part of the people who do not know the work, and I could give others. The statement of the chairman is correct. If censorship is to be set up, the proper place is in the department before the work is done.

Mr. **Anderson**. It seems to me the whole proposition is a mechanical one, and that if somehow it was possible to set up a relationship between the Government Printing Office and the Joint Committee on Printing these difficulties ought to be smoothed out in some way. They are not unsusceptible, and if everybody understood everybody else's point of view these difficulties would be eliminated.

When Mr. Carter was before the Legislative Committee for the Government Printing Office, I made some inquiry in regard to the board which has been set up down there, to determine whether publications are within the terms of the law or not. He suggested that he thought that a conference between the various people connected with the bureaus should smooth out the difficulties. Have any conferences been held?

Mr. **Pugsley**. Yes; the Secretary and I were in session with the Joint Committee on Printing two hours, two weeks ago, in which we had all these matters up, and attempted to find out what we were supposed to do in connection with the matter. The joint committee seemed to be rather doubtful as to just the powers they had or did not have. As one member of the committee expressed it, they considered the authority granted them as rather nebulous, and we were left in the dark as to how to proceed in the matter. Our relations with the Public Printer and the Joint Committee on Printing are friendly, and we want to do everything we can to cooperate. We want to know what we are to do. We are not only anxious that the work of the department shall not be hampered but are as anxious to save money as anybody can be.

Mr. **Magee**. You want to know what they have authority to do?

Mr. **Pugsley**. Yes.

Mr. **Magee**. Having that authority, you can cut your cloth accordingly?

Mr. **Pugsley**. The chairman of the Committee on Printing made this statement to the Secretary during the session referred to. He said that under the law of March 4, 1921, known as Public act 389, there were two clauses, one of which gave the Secretary of a department the power to publish with the funds allotted to his department those things which he considered necessary to the proper conduct of the business of the department. The other one stipulated that periodical journals and magazines or similar periodicals should cease on December 1 unless Congress granted it specific authority. A suggestion there was that the Secretary could take his choice of the two clauses, which were contradictory, one granting him the power to publish anything and the other stating that certain publications should cease, so we do not know exactly how we shall proceed in the matter.

Mr. **Magee**. The later one would control.

Mr. **Pugsley**. They are both in the same act.

Mr. **Anderson**. They do not apply to exactly the same situations. One of them applies to periodicals and the other one applies to periodicals, but otherwise to other publications. I guess we have the situation now. As I remember your estimate for this year, it is $125,000?

Mr. **Pugsley**. It carries no total increase, but it makes the appropriation the same as the regular appropriation of last year, plus the emergency appropriation.

Mr. **Buchanan**. There is no estimate, is there?

Mr. **Anderson**. Yes; it was made in connection with the legislative bill, but after the legislative bill was considered by the committee it was determined, as I said the other day, that this addition for printing should be carried separately in connection with the appropriations for the department, so we left them out in the legislative bill.

Mr. **Pugsley**. There is no increase over the amount of money used for this item this year.

Mr. **Anderson**. There would be an increase due to the reduced cost of paper and material.

Mr. **Pugsley**. But we feel that small increase is justified, because of the extra need of money for the publication of material that has not been prepared and published in times past, and because of the extra work Congress is constantly adding.

Mr. **Anderson**. From the figures submitted by the Public Printer that increase would be $125,000. His estimate based upon your estimate, as I understand it, was something like $721,000.

Mr. **Ball**. That would be the same amount in equivalent printing.

Mr. **Anderson**. Yes.

Mr. **Pugsley**. I want to call attention to the fact that the appropriation for the department printing has been only very gradually increased while the work put on the department has been much more rapidly increased.

Mr. ANDERSON. There has been quite an increase in the items. There were $474,000 in 1913 and $850,000 in 1922.

Mr. BALL. That does not come anywhere near the difference in the cost of printing in those two years.

Mr. PUGSLEY. Let me call attention to the fact that during the past year there has been added to the burden of the printing fund a tremendous amount by the passage of the packer control act, the grain act, and others. You have to take care of their needs out of the printing fund; also during the past year the appropriations for the roads and other activities of the department have been very much more rapidly increased than has the increase of the printing fund, so we feel that the same amount spent next year that we have spent during the past year would not even adequately take care of the proportionate increase in the demands on the printing fund.

REPAY WORK.

Mr. ANDERSON. There is an addition to the direct appropriation to the Government Printing Office, allotted to the Department of Agriculture appropriation. It has averaged from $60,000 to $80,000 on repay work. What does that come out of?

Mr. PUGSLEY. Mr. Cobbs will answer that.

Mr. COBBS. During the last year that repay work amounted to $64,900 and was paid for from certain funds appropriated to the bureaus, which are available for printing. The largest amount is for the Bureau of Animal Industry, meat-inspection tags, I think, $26,982. The Bureau of Markets, in some of its regulatory work, $12,632; the Weather Bureau, $10,894; the States Relations Service, $8,045; the remainder is made up of small amounts from funds in some of the other bureaus—for example, the Bureau of Entomology, Forest Service, office of the Secretary, and Bureau of Markets. All this work was primarily administrative printing, which can be paid from funds which are available to the different bureaus.

There is one point which should be mentioned here, and that is the fact that so much of our appropriation is spent under mandatory law—that is, for work required by Congress. Last year we spent $90,378 in printing the Year book, Soil Surveys, and different other reports which we are required by law to make. That amount tends to increase each year.

Mr. ANDERSON. That is due to the increased cost of printing?

Mr. COBBS. I think it was not due to the increased cost of printing, because the peak has been passed, and paper is considerably less; but it is due to the number of reports we put out.

SALARIES.

Mr. ANDERSON. We will take up now the statutory roll, on page 168, Division of Publications.

Mr. COBBS. I may say, before I start in detail, that there are three main kinds of changes in the bill. The first changes are in the nature of increases, which are caused by the transfer to the Division of Publications of certain positions in connection with the consolidation of the duplicating work of which Mr. Pugsley has spoken.

Mr. **Anderson**. Is that a consolidation that has already been made?

Mr. **Cobbs**. Yes; that consolidation has already been made. You may recall that last year we came before the committee and got a deficiency appropriation of $5,000 to enable us to meet the cost. The consolidation was made effective last fall, and the positions which were occupied by the people doing that work in the various bureaus have been transferred to the Division of Publications and the positions dropped from the bureaus in which they were originally carried. There is one exception to that, and that is in the case of the item, lines 2 and 3, page 168, two assistant editors, at $2,000 each, an increase of one. That man has been transferred to the division from the Forest Service. He was carried on their lump-sum roll, and the roll was not decreased. That is a new place and represents an increase.

Mr. **Anderson**. Was he working under the Forest Service, or was he detailed to the Division of Publications?

Mr. **Cobbs**. He was in the Division of Publications.

Mr. **Anderson**. Have you got a list of these transfers and the appropriations from which the transfers have been made?

Mr. **Cobbs**. I have an informal list here in the way of a letter prepared to the Assistant Secretary, which I can submit. I can make the changes quite plain in case you want to go down the line.

Mr. **Anderson**. That is where we want to go.

Mr. **Cobbs**. The next kind of change is where we are asking for certain changes of designations in order to bring the titles of positions in the division into some kind of uniformity and allow us as much latitude as possible in filling the positions. These changes do not contemplate any change of duties or of personnel.

The third general change which is asked for is the consolidation into one sum of the various lump sums that have been made to the division for its general expenses. I want to go into detail on that later. The first change in the bill is that of assistant editor, $2,000, which has been transferred from the Forest Service.

Mr. **Anderson**. What item is that taken out of?

Mr. **Cobbs**. That is the item, "Two assistant editors, at $2,000 each," lines 2 and 3, page 168.

Please note that the assistant at $2,500 shown as dropped in line 2, page 168, is reinserted in line 12, same page. This is done to get uniformity in the bill and involves no other change.

In lines 5 and 6 we ask for one assistant in charge of addressing, duplicating, and mailing. This man is transferred to the division from the roll of the Bureau of Agricultural Economics.

The position of chief cinematographer, at $2,500, shown as dropped in line 6 is reinserted in line 8. This is done to get all the "assistants" in charge of the sections together and involves no other change.

The next change is assistant in charge of illustration, lines 6 and 7. That position we are asking to have changed to one draftsman or photographer, lines 8 and 9. The man who is in charge of the illustration section occupies the $2,500 statutory position as artist and designer on line 14, and that higher salary will always be paid to the assistant in charge of the section. We are asking to change the title of the superintendent of distribution, at $2,500, lines 8 and 9, to assistant in charge of distribution, at $2,500, lines 7 and 8. No change of duties or personnel is involved.

We have at the present time three positions as assistant editor, $1,800 each, line 11. We ask, line 11, to change the designation of one of those positions from assistant editor to clerk class 4, at $1,800, line 19, which will involve an apparent change, but no actual change in the total.

Mr. BUCHANAN. Is there any change in salary?

Mr. COBBS. No; the only change is in designation from that of assistant editor to clerk class 4. We are also asking to change one assistant, at $1,600, lines 11 and 12, for an additional place, clerk class 3, at $1,600, line 20.

Mr. ANDERSON. You have an assistant at $1,600—assistant editor?

Mr. COBBS. Yes, sir.

Mr. ANDERSON. That is another story. What is substituted for that?

Mr. COBBS. One class 3 clerk, line 20.

Mr. BUCHANAN. Taking one assistant editor and making a clerk out of him at the same salary?

Mr. COBBS. Yes, sir. It is difficult to get an editor at that salary, and we are asking for a change to a clerk, whom we can get. We are asking also to change two assistants at $1,400, line 13, for two class 2 clerks at $1,400, lines 20 and 21. We are asking to drop one indexer at $1,400, lines 13 and 14, for a class 2 clerk.

The next change comes in the photographers. We have two at $1,400, line 16. We are asking for three, one of whom is to be transferred to the division from the Bureau of Animal Industry.

Mr. ANDERSON. Is he employed there now?

Mr. COBBS. Yes, sir.

Mr. ANDERSON. What does he do?

Mr. COBBS. Prepare illustrations for farmers' bulletins.

Mr. ANDERSON. How long has he been employed there?

Mr. COBBS. I could not say offhand. He has been there ever since I have been in the division, a year or a year and a half, at least.

We are asking for a change of title, lines 18 and 19, of a foreman in miscellaneous distribution, at $1,500, to a machine operator at $1,500, line 1, page 169.

Mr. BUCHANAN. Machine operator? It is executive clerk down here.

Mr. COBBS. That follows immediately after. You see the foreman at $1,500, lines 18 and 19; we ask later for a machine operator at $1,500, line 1, page 169. We have one executive clerk at $2,000, line 19, who has been transferred to the division from the Bureau of Animal Industry in connection with this consolidation of the duplicating work.

Mr. BUCHANAN. Is he employed on publication work?

Mr. COBBS. Yes; he is employed on publication work.

Mr. BUCHANAN. That is an increase?

Mr. COBBS. That is an increase in the division. The Bureau of Animal Industry statutory roll will be decreased by the same amount.

You will note under clerks, class four, lines 19 and 20, that we are asking for five instead of four, providing for the change from assistant editor that I spoke of on line 11. On line 20, we are asking for four clerks, class 3, providing for the assistant editor, at $1,600, lines 11 and 12. In clerks, class 2, lines 20 and 21, we have an increase of five. This comes about from two assistants at $1,400, line 13, one indexer, at $1,400, lines 13 and 14, whom we propose to make clerks, class 2, and two positions which are transferred to us in connection with the consolidation of this duplicating work.

Mr. **Anderson**. Where are they being transferred from?

Mr. **Cobbs**. Both came from the Bureau of Agricultural Economics.

Mr. **Anderson**. Are they employed there?

Mr. **Cobbs**. They are employed in the consolidated duplicating section now.

Mr. **Anderson**. What were they previously doing in the Bureau of Economics?

Mr. **Cobbs**. The same work for the Bureau of Economics duplicating section. There is an increase of two clerks, class 1, line 21. One of those comes by transfer from the statutory roll of the Bureau of Agricultural Economics, and one from the statutory roll, Bureau of Chemistry. There is an increase of two in the case of the $1,100 grade, lines 21 and 22, both of them coming from the statutory roll of the Bureau of Economics. The next change is in lines 22 and 23 in the case of the mechanical assistant, at $1,980, who was transferred from the statutory roll of the Bureau of Agricultural Economics, where he was engaged in duplicating work.

Mr. **Buchanan**. At the same salary?

Mr. **Cobbs**. Yes, sir; the same salary.

At the top of page 169 you will note a machine operator at $1,500. We are asking for this position in lieu of "foreman, miscellaneous distribution," lines 18 and 19, page 168. We are asking for four machine operators at $1,400, line 1, page 169, three of them by transfer from the statutory roll, Bureau of Economics, and one from the lump-sum States Relation Service.

Mr. **Anderson**. Are they employed over there in the same kind of work?

Mr. **Cobbs**. Yes, sir. We ask for 12 machine operators at $1,200 each, line 2. We have five at present. The rest all come by transfer, one from the lump sum, Bureau of Animal Industry, and five from the statutory roll of the Bureau of Agricultural Economics.

Mr. **Anderson**. How many?

Mr. **Cobbs**. Five; let me correct myself. One place is being submitted in lieu of a chief folder, which is dropped in the next line. There are five new places at $1,000 each.

Mr. **Anderson**. How about the $1,100?

Mr. **Cobbs**. I see that. I skipped that. There are seven machine operators at $1,100. Five are transferred from the statutory roll of States Relation Service, one from the statutory roll of the Bureau of Chemistry, and one clerk, $1,020, who is on the roll of the Bureau of Chemistry, will be promoted to $1,100, an increase of $80, with a change of title from clerk to machine operator. All of those rolls have been decreased. There are five places as machine operators at $1,000 by transfer from the statutory roll of the Bureau of Agricultural Economics, line 2.

As I explained, instead of the "chief folder," on line 3, we are asking a machine operator's place at $1,200 on line 2. The next change comes in the messengers or laborers; we ask, line 5, for 12 at $720 instead of 10, two having been transferred to us from the statutory roll of the Bureau of Agricultural Economics. We have dropped one messenger boy at $720, line 7, having transferred one to the statutory roll of the Secretary's office. We are asking for a new place at $660, line 7, by a transfer from the statutory roll, Bureau of Economics. We are asking for six places at $480, in lieu of four, having gotten one from the statutory roll in the Secretary's office, and one from the statutory roll, Bureau of Agricultural Economics.

Mr. ANDERSON. I wish you would submit a statement of these transfers, showing the bureaus, and the items of the appropriation from which they have been transferred.

Mr. COBBS. All right; I will do that.

Mr. PUGSLEY. Would you like to have that statement submitted in writing?

Mr. ANDERSON. I would like to have a statement for the use of the committee.

Mr. PUGSLEY. You would like to have him include this in the testimony now and submit a written statement later?

Mr. ANDERSON. Yes, sir. I want a statement in the form of tabulation, which shows just where the transfers come from, and the items of the appropriation from which they are taken. It is difficult to follow a long text on a proposition of this kind.

(The statement requested by Mr. Anderson follows:)

The following tabulation shows all proposed changes to the statutory roll of Division of Publications:

Change of title (no change of salary).

Present designation.	Page.	Line.	Salary.	Proposed designation.	Page.	Line.	Salary.
Assistant in charge of illustrations	168	6, 7	$2,100	Draftsman or photographer	168	9, 10	$2,100
Superintendent of distribution	168	8, 9	2,500	Assistant in charge of distribution	168	7, 8	2,500
Assistant editor	168	11	1,800	Clerk, class 4	168	19, 20	1,800
Do.	168	11, 12	1,600	Clerk, class 3	168	20	1,600
Assistant (2)	168	13	1,400	Clerk, class 2 (2)	168	20, 21	1,400
Indexer	168	13, 14	1,400	Clerk, class 2	168	20, 21	1,400
Foreman, miscellaneous distribution	168	18, 19	1,500	Machine operator	169	1	1,500
Chief folder	169	3	1,200	Do.	169	2	1,200

Transfers.

Number.	Designation.	Salary.	Transferred from—	Bureau.
1	Assistant editor	$2,000	Lump sum	Forest Service.
1	Assistant in charge of addressing, duplicating, and mailing.	2,400	Grain standard act	Agricultural Economics.
1	Draftsman or photographer	1,400	Statutory roll	Animal Industry.
1	Executive clerk	2,000	.....do	Do.
2	Clerk, class 2	1,400	.....do	Agricultural Economics.
2	Clerk, class 1	1,200	1 statutory roll 1 statutory roll	Chemistry. Agricultural Economics.
2	Clerk	1,100	Statutory roll	Do.
1	Mechanical assistant	1,980	.....do	Do.
4	Machine operator	1,400	3 statutory roll 1 farmers' cooperative demonstration.	Do. States Relation Service.
6	.....do	1,200	5 statutory roll 1 eradication of tuberculosis	Agricultural Economics. Animal Industry.
7	.....do	1,100	5 Statutory roll 2 statutory roll [1]	States Relations Service. Chemistry.
5	.....do	1,000	Statutory roll	Agricultural Economics.
2	Messenger or laborer	720	.....do	Do.
1	Messenger boy	660	.....do	Do.
2	.....do	480	1 statutory roll 1 statutory roll	Office of the Secretary. Agricultural Economics.

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[1] One of these positions is carried by the Bureau of Chemistry as a clerk at $1,020 per annum. Increase of $80 requested in order to make machine operator places uniform, the incumbent performing the duties of a machine operator.

One messenger boy at $720 transferred to statutory roll, office of the Secretary.

NOTE.—The position of assistant, $2,500, dropped, as shown by line 2 of bill is shown again as a new position, line 12, change being made in order to get all positions of class together.

The position of chief cinematographer, $2,500, dropped as shown by line 6 of bill, is shown again as a new position, line 8, change being made in order to get all positions of class together.

Mr. BUCHANAN. Are there any of these employees in new places not transferred from any of the departments other than the Agricultural Department?

Mr. COBBS. They are all places being transferred to the division from some other bureau of the department.

Mr. BUCHANAN. Are they all doing the same character of work in this division as they were doing in the other divisions?

Mr. COBBS. With the exception of one place, all of them are doing the same kind of work. I will have to modify that in the case of some of the laborers, because I do not know whether their duties are identical, but in general they are the same.

Mr. PUGSLEY. This work was the result of the consolidation, Mr. Buchanan.

Mr. BUCHANAN. I have a note in here about these places being new places—one clerk, $1,600, and one at $1,200. Was that in your testimony yesterday?

Mr. PUGSLEY. No; I was not here yesterday.

Mr. BUCHANAN. There are no new places then at all?

Mr. PUGSLEY. No, sir.

Mr. BUCHANAN. According to your estimate there are?

Mr. COBBS. How do you make it?

Mr. BUCHANAN. One superintendent of distribution.

Mr. COBBS. That is the present title. We are asking to have it changed.

Mr. BUCHANAN. Assistant in charge of distribution?

Mr. COBBS. Yes. The man who will occupy that place we now call our superintendent of distribution, the place shown in lines 8 and 9, page 168; the same man, but a change in title.

Mr. BUCHANAN. All we have here is what you give us.

Mr. COBBS. The way the estimates are made up may be misleading.

Mr. BUCHANAN. Then you have here a photographer at $2,100.

Mr. COBBS. The same thing applies there exactly.

Mr. BUCHANAN. Then there is a machine operator at $1,500.

Mr. COBBS. He is that foreman of miscellaneous distribution, line 18, page 168, toward the bottom of the page. He is changed from that to machine operator. A change of title is all that is involved.

Mr. BUCHANAN. I was confused in the bill here.

Mr. COBBS. Whenever there is a change of title we have to show the places as being dropped, and substitute new places for them, which makes confusion, when, as a matter of fact, the places are identical.

Mr. ANDERSON. If it was submitted in lieu of the other place, it would be understood.

Mr. COBBS. I asked about doing that when these estimates were being made up, and was told that this was the form in which they were to be made.

GENERAL EXPENSES.

Mr. ANDERSON. We will take up your next item on page 170, and under the new item on page 173.

Mr. COBBS. We are asking here for a consolidation in the item on page 173 of the various miscellaneous funds which we now have in the Division of Publications. Those funds, all of them, are quite small, as you will see by referring to the previous pages. We have to do a tremendous amount of bookkeeping, and when our quarterly allotments are set up it makes the thing so inflexible that we have to do a lot of needless work, running around and adjusting accounts, to keep within the allotments established. For example, as a result of the new consolidation we are having to spend for paper amounts very considerably in excess of the quarterly amounts which are available from our stationery fund. We can not spend, as you know, more than one-quarter of the amount in any quarter, As a result of that, we have been very much embarrassed, and at times have run short of paper, and have had to go to the bureaus for whom we do work to get them to buy paper and finance us until our funds became available, from quarter to quarter. Lumping the funds together will give us greater latitude. There is no increase in the amount. It will not only give us greater latitude but will make the bookkeeping easier and the whole organization very much more flexible than when we are tied down to the small amounts as they are here, and when we often can not meet our needs as they come up.

ASSISTANT IN EXHIBITS.

Mr. ANDERSON. Why do you carry an assistant in exhibits under this item? Is that regarded as extra labor, or emergency employment?

Mr. COBBS. The Assistant Secretary will want to talk about that work. That extra labor fund on page 172, as you will recall, was increased several years ago to provide for the salaries on exhibit work, which have to be paid in Washington. The exhibit work until last fall was in the Division of Publications, but since it has been transferred to the office of the Secretary. As far as the administration of the division is concerned, I want to urge that this new language be put into the bill, because you really have no idea of the amount of bookkeeping work which is involved, and the constant annoyance of running up against the fact the appropriation can not be exceeded during any quarter when you have got to make expenditures.

Mr. BUCHANAN. You reduce the total, do you not?

Mr. COBBS. No; not intentionally.

Mr. ANDERSON. How much is paid in salaries out of this item?

Mr. COBBS. At the present time we are tied down to $11,380, appropriation for emergency employment and extra labor.

Mr. PUGSLEY. How much will be paid out?

Mr. COBBS. I do not know what the amount for the exhibits work will be. I have not any knowledge of that. The Division of Publications will need at least $2,500 and should have more.

Mr. ANDERSON. You show $11,380?

Mr. COBBS. I am going on the basis of the new arrangement. The office of exhibits is now attached to the Secretary's office, and the bulk of that $11,380 will be allotted to the Division of Exhibits.

I might say here, Mr. Chairman, that we very often have need in the division for extra people in connection with the distribution of the farmers' bulletins and other department publications and for other work that can not be handled by the regular force. At the present time the mail is running exceedingly heavy, and we will probably have to put on before the spring comes additional people to carry out that distribution of publications.

Mr. ANDERSON. To be perfectly frank about it, I think there ought to be a separation of salaries and wages from these items of equipment and material, otherwise you will have that force, half a dozen of them, and we will have to make another appropriation next year for equipment, and I think there ought to be a separation of the items.

SALARIES AND WAGES IN THE DISTRICT OF COLUMBIA.

Salaries and wages in the District of Columbia: I am trying to get at what you want to have for salaries and equipment.

Mr. COBBS. The Division of Publications is dirt poor. We are constantly having to run around and asking the other bureaus to buy paper for us, or help us out in some other way.

Mr. ANDERSON. You will be poorer yet if you put a lot of employees on this appropriation.

Mr. COBBS. If we put any employees on this roll we will not be able to function, because these amounts are needed for the supplies which we have to have to carry on the work with.

Mr. ANDERSON. I happen to know that the pressure for putting people on rolls is sometimes pretty heavy.

Mr. COBBS. Yes, sir; it is.

Mr. ANDERSON. I do not intend that there shall be any chance of doing it.

Mr. PUGSLEY. You can submit to Mr. Anderson the estimated amount you think there should be for the salaries?

Mr. COBBS. The Division of Publications would require not less than $2,500, I should say.

Mr. ANDERSON. If you are going to carry any employees in Washington you will have to include that?

Mr. COBBS. The Assistant Secretary will talk about the exhibit work.

Mr. PUGSLEY. I think we had better submit a statement on that, to be incorporated in the record.

Mr. ANDERSON. It seems to me that the proper thing to do would be to carry on this appropriation, the necessary wages and salaries connected with emergency and extra employment in the Division of Publications, and then under that item carry a limitation, or addition there, which would take care of your salaries in the District of Columbia, on your extra work.

Mr. PUGSLEY. We will prepare a statement and submit it to you.

(The statement requested by Mr. Anderson follows:)

During the present fiscal year $11,380 will be spent for extra labor and emergency employments in the District of Columbia. This amount is specifically provided for by the current appropriation bill. If any limitation is placed in the paragraph providing funds for salaries and wages in the District of Columbia for the fiscal year 1923, the amount should not be less than $11,380, or the amount now being provided for the Division of Publications for its extra labor and emergency employments and assistants in exhibits.

Mr. COBBS. One further point there that I would like to make is on the same line that I started on, the amount of money available to the division at the present time. Our salaries in the division are frightfully low, lower by $100 than the salaries paid clerical help in any of the bureaus. The result is that it is difficult for us to keep bright promising people in the division, with the present statutory salaries, hope has been that the committee would see fit to give the division some lump-sum fund, which could be used for salaries, and which would enable us to pay enough to keep promising employees whom we are constantly losing because there is no chance for advancement in the division. We could also take care of the emergency work of the division from this fund. If it is possible to make that provision in this item, and to allow us to use funds which we might save by economizing, I should like to see it done. That is all, so far as I am concerned.

Mr. ANDERSON. Is there anything further on this item?

Mr. PUGSLEY. No, sir.

Mr. ANDERSON. If you have finished with this item, Mr. Johnson would like to make a statement, and I would like to have a statement from you with respect to some of the publications work. I have told him that we have gone over that, and there are some matters which he can discuss.

STATEMENTS OF HON. ALBERT JOHNSON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF WASHINGTON, AND HON. EDGAR R. KIESS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF PENNSYLVANIA.

PRINTING AND BINDING.

Mr. JOHNSON. I suppose the committee and the representatives of the Department of Agriculture are of the opinion that the Joint Committee on Printing did not eliminate some of the publications of the departments of the Government.

Mr. PUGSLEY. Your contention is that the law did that?

Mr. Johnson. I desire to call attention to the fact that a section added to one of the bills forbids the publication of various publications. Section 3 of Public Act No. 389, Sixty-sixth Congress, approved March 4, 1921, reads as follows:

> Any journal, magazine, periodical, or similar publication which is now being issued by a department or establishment of the Government may, in the discretion of the head thereof, be continued, within the limitations of available appropriations for other Government funds, until December 1, 1921, when, if it shall not have been specifically authorized by Congress before that date, such journal, magazine, periodical, or similar publication shall be discontinued.

Mr. Anderson. Congress took no action to authorize these publications?

Mr. Johnson. No; Congress failed to authorize them, and extensions were made from time to time, but finally no extension was made, and they died. Now, various plans have been offered in an effort to revive these publications that everybody agrees are necessary, and these plans simmer down to placing the authority in the hands of a Joint Committee on Printing, but I am inclined to doubt what Congress would do, and I do not believe the Members of Congress want to have that responsibility; in other words, they do not want to have the responsibility or the right to say that this publication is good and that one is bad, when we can not know.

Mr. Anderson. As I was saying sometime ago, it seems to me perfectly clear if authority is to be granted it should be so that it could be exercised in the departments before a great deal of work in research has been made, because the waste of doing the work in anticipation of the printing is a great deal more than the waste involved in printing.

Mr. Johnson. Yes, sir; the point I want to get before the committee is something like this: I understand the subcommittee handling the Interior Department is carrying an item for the publication of "School Life." That has value; it has a circulation of 30,000, and a copy of that sells to the public at 30 cents. It has value, there is no question about it. Country school teachers are very glad to get it, and the request is made by them that it be continued, and they say that they have not the funds to circulate it.

I am told that the legislative subcommittee is carrying out in its bill an appropriation of $2,000,000 for running the Government Printing Office and doing the printing of Congress, whereas the previous appropriations have been five or six million dollars. It occurs to me that if that plan of a revolving fund in the Government Printing Office, for the operation of the Printing Office, is carried out and the various subcommittees give the departments of the Government certain funds for printing on the showing made by the representative of the department, that in itself, properly carried out, will substitute for this law, and the Secretary of Agriculture, feeling that he wants a boot and shoe journal or a horseshoer magazine, or whatever magazine he feels he should put out for the people his department is designed to furnish information to, would put it out on a printing appropriation, and the $6,000,000 would be gone.

Then the point arises with the chairman and myself, is it possible for the Printing Committee to offer some legislation that would be a substitute for this prohibitive act, that would permit departments to do their printing within the sums appropriated in these bills? Do you see the point?

Mr. PUGSLEY. You would put up to the department the type of printing it is to do, but specify that it shall not exceed its printing appropriations?

Mr. JOHNSON. Yes, sir.

Mr. PUGSLEY. And make the department responsible for the administration of its printing fund, making the limitation the amount of money appropriated?

Mr. JOHNSON. Yes.

Mr. PUGSLEY. Rather than setting up specific limitations on the part of Congress?

Mr. JOHNSON. You can see that it is not for the three Congressmen and three Senators on that committee to say that School Life is not a good publication and that the Experimental Record is. That is a preposterous situation.

Mr. PUGSLEY. You do not feel that the joint committee or any other congressional authority should act as a censor?

Mr. JOHNSON. We do not propose to do it. That is all that holds us back now, but it is like this: A committee of three Senators and three Congressmen carrying on the work of printing, which has a great many details, deciding whether such a publication is warranted, and then seeing whether it is exceeding its bounds, is not right.

Mr. PUGSLEY. I think the proposition you make is fundamentally sound.

Mr. MAGEE. Who would have the power to determine what they should publish?

Mr. JOHNSON. We do not want to do that.

Mr. MAGEE. Who would have?

Mr. JOHNSON. We have had, and under that power, before the various extensions, 111 publications quit under a little pressure. They could not make a showing. This committee on printing, three Congressmen and three Senators, are being blamed right and left for knocking down the Journal of Agricultural Research, and publications of that kind. We did not do that at all.

Mr. KIESS. It would be up to these gentlemen to convince the subcommittee as to the amount of money needed.

Mr. JOHNSON. Yes, sir; but before you get to that point you have got to repeal this law, which is very clear, an amendment to the sundry civil bill.

Mr. ANDERSON. What we thought we might do, Mr. Johnson, is to attach to the appropriation a limitation, or a provision that not more than so much might be spent in the Journal or Agricultural Research, and so much in other publications, and so on, which would be authority for the publication of those publications.

Mr. JOHNSON. Here is the Department of Labor, whose appropriations are made by some other committee, and I do not believe that Members of Congress want to stand up and authorize, as a matter of fairness—I do not believe that they would authorize Department of Agriculture magazines and not reestablish the Monthly Labor Review.

Mr. PUGSLEY. As I gather what you have in mind, the limitation you would make would be on the amount of money appropriated, on the showing, rather than stating in the appropriation what shall be published?

Mr. JOHNSON. I thought we would not show it at all.

Mr. PUGSLEY. You would make the Secretary entirely responsible?

Mr. JOHNSON. This might take an act of Congress, to authorize the various Secretaries to reestablish certain publications until July 1.

Mr. PUGSLEY. Your thought is that varying conditions might make it necessary to change the form and type of the publications?

Mr. JOHNSON. I picture this—and I do not want to say much further on this—that Congress can not, by the nature of things, tell you what shall be printed; for instance, I might be able to show the Department of Labor that they ought to get out a magazine to assist country cobblers. Kiess might not agree to that. You might convince me that some form of printing, any agricultural publication, was necessary, but you could not convince all of Congress. We can not be wrangling all the time, and we can not be putting out bad publications.

Mr. MAGEE. Do you not want to give them authority to publish, at public expense, what they might say is satisfactory? It might be disagreeable to determine what shall be published, but it seems to me there ought to be some authority assumed by some responsible body.

Mr. JOHNSON. Then the only thing to do is to gather them all up and try and put it over.

Mr. MAGEE. The trouble now is, while having, in my legal judgment, the general authority under the law to publish certain things, yet this limitation deprives you of the authority to make the necessary publications.

Mr. JOHNSON. We can not establish a single one.

Mr. MAGEE. Your hands are tied.

Mr. JOHNSON. Yes, sir.

Mr. KIESS. The Senate passed a joint resolution in this Congress which did give the power to the Joint Committee on Printing to determine.

Mr. MAGEE. Did it come up in the House?

Mr. KIESS. No; it was on the calendar. Yesterday it was referred back to the Printing Committee, and it is now there.

Mr. JOHNSON. It is a committee of three members. They are not censors, and will not be censors. The committee offered a continuing plan to carry it on for 30 days, and to carry it on was a sign of economy.

Mr. MAGEE. It is a bar to these publications.

Mr. KIESS. The main thing Mr. Johnson wanted to bring out is that the Joint Committee did not stop any publication; it was done by an act of Congress, but the impression has gone abroad, and we have been deluged with letters and telegrams that the Joint Committee stopped the publications, and asking us to continue them, and we have no power to continue it.

Mr. PUGSLEY. How long would it take to get a law through such as you suggest?

Mr. JOHNSON. Thirty days.

Mr. MAGEE. What is the suggestion? My suggestion is that you undertake to bring a resolution out from the Printing Committee permitting the Secretaries to revive certain publications until July 1—those copies which have failed to be printed in January and February, and then authorize in that piece of legislation the publication of such documents as may be considered necessary by the Secretaries within the limit of the money appropriated for printing.

Mr. PUGSLEY. I think that Mr. Johnson's plan is administratively sound. When you have a head of a department you ought to hold him responsible for the funds, and if he does not spend them properly, he should be taken to task. The remedy lies in limiting the appropriation.

Mr. BALL. The appropriate committee is the committee which appropriates for the scientific work. This committee would not only pass on the appropriations, but could censor the work and the publications, and then it will be done alike.

Mr. JOHNSON. If the committee should come up here and show that "School Life" should be printed, and the committee agreed to that, that would be carried.

Mr. PUGSLEY. In other words, the committee should review the work that makes the appropriations.

Mr. JOHNSON. Exactly. I think that is all.

AGRICULTURAL EXHIBITS AT STATE AND OTHER FAIRS.

Mr. ANDERSON. The next item is page 174, to enable the Secretary of Agriculture to make suitable agricultural exhibits, etc. Do you want to discuss that?

Mr. PUGSLEY. Mr. Hiscox will cover that feature. I will make just a preliminary statement, and then you can ask Mr. Hiscox any questions that you desire. Perhaps he will wish to make a short statement also.

We considered it was administratively wise to attach, during the process of reorganization of the extension and publication work, the office of exhibits to the Secretary's office, because the office of exhibits is in contact with all of the bureaus and is in a sense a piece of extension work rather than a piece of publication work. Therefore the exhibit work has been attached to the office of the Secretary for the time being. Would you like a statement of the type of work which is being done in exhibits?

Mr. ANDERSON. I should like to know what the type of work is and where the exhibits were made last year.

Mr. PUGSLEY. Mr. Hiscox, who has charge of that office, will make that statement.

Mr. HISCOX. I have a list of places at which the department made exhibits last year. Do you want that read?

Mr. ANDERSON. If you will just put it in the record, perhaps that will be sufficient.

Report of showings, Office of Exhibits, fiscal year 1922.

City and State.	Date.	Name of fair.	Estimated attendance.	Floor space.
				Sq. ft.
Atlanta Ga	Oct. 13–22	Southeastern Fair	158,856	3,000
Billings, Mont	Sept. 20–25	Midland Empire Fair	50,000	1,100
Baltimore, Md.[1]	Dec. 1–10	Baltimore Pigeon and Pet Stock Association.	7,000	900
Do.[1]	July 11–16	Marine Show, Export and Import Exposition.	90,000	600
Boise, Idaho	Sept. 26–Oct. 1	Idaho State Fair	80,000	1,300
Chicago, Ill.[1]	Nov. 26–Dec. 3	International Livestock Exposition	175,000	5,000
Chattanooga, Tenn	Sept. 17–24	Chattanooga Interstate Fair	94,131	2,500
Columbus, S. C	Oct. 24–28	South Carolina State Fair	50,000	3,000
Detroit, Mich	Sept. 2–11	Michigan State Fair	285,000	4,000
Douglas, Wyo	Sept. 13–16	Wyoming State Fair	17,000	1,100
Elko, Nev	Sept. 15–17	Elko County Fair	5,000	1,300
Fresno, Calif	Sept. 26–Oct. 1	Fresno District Fair	100,000	500
Greenville, S. C.[1]	Oct. 6–12	Textile Raw Products Show	10,000	700
Helena, Mont	Sept. 12–17	Montana State Fair	80,000	1,100
Hamline, Minn.[1]	Oct. 8–15	National Dairy Show	36,000	10,000
Kansas City, Mo.[2]	Nov. 29–Dec. 4	Heart of America Poultry Show	15,000	600
Little Rock, Ark	Nov. 11–19	Arkansas State Fair	64,657	3,500
Milwaukee, Wis	Aug. 20–Sept. 3	Wisconsin State Fair	237,014	4,000
Nashville, Tenn	Sept. 16–23	Tennessee State Fair	122,912	3,000
Portland, Oreg.[1]	Nov. 5–12	Pacific International Livestock Exposition.	100,400	4,000
Pueblo, Colo	Sept. 26–30	Colorado State Fair	40,000	3,000
Raton, N. Mex	Oct. 4–7	Northern New Mexico Fair	5,543	1,300
Riverside, Calif	Oct. 11–16	Southern California Fair	92,000	1,400
Rochester, N. H	Sept. 20–23	Rochester Fair	28,602	600
Sacramento, Calif	Sept. 3–11	California State Fair	190,000	1,000
Salt Lake City, Utah	Oct. 3–8	Utah State Fair	115,000	1,300
Sedalia, Mo	Aug. 8–20	Missouri State Fair	187,000	3,500
Sparks, Md	Sept. 5–10	Maryland State Fair	15,000	600
Spokane, Wash	do	Spokane Interstate Fair	80,000	1,100
Springfield, Mass.[1]	Sept. 18–24	Eastern States Exposition	240,000	12,000
Stuttgart, Ark.[1]	Nov. 30–Dec. 4	Arkansas Rice Carnival	30,000	4,000
Salem, Oreg	Sept. 26–Oct. 1	Oregon State Fair	132,330	1,600
Stockton, Calif.[1]	Dec. 6–11	California Dairy Council	6,800	4,000
Topeka, Kans	Sept. 12–17	Kansas Free Fair	210,000	5,000
Washington, D. C.[1]	Oct. 17–22	American Mining Congress	1,108	600
Waterloo, Iowa [1]	Sept. 26–Oct. 2	Dairy Cattle Congress	100,010	4,000
Wheeling, W. Va	Sept. 5–10	West Virginia State Fair	100,000	4,000
Wichita, Kans.[1]	Sept. 26–Oct. 8	International Wheat Show	150,000	4,000
Yakima, Wash	Sept. 19–24	Washington State Fair	67,690	1,600
Ames, Iowa [1]	Jan. 30–Feb. 4, 1922	Iowa State College (farmers' week)		3,000
Madison, Wis.[1]	do	Wisconsin Dairy Show		3,000
New York, N. Y.[2]	Jan. 25–29	Madison Square Garden Poultry Show.	35,000	700
Norfolk, Va.[2]	Jan. 3–7	Old Dominion Poultry Show		700
Saginaw, Mich.[1]	Feb. 14–17	Michigan Dairy Show		3,000
Washington, D. C. [1]	Feb. 6–18	National Food Show and Household Exposition.		700
Total			3,604,053	116,800

[1] Special shows.

[2] Poultry shows.

Mr. ANDERSON. You may proceed, Mr. Hiscox.

Mr. HISCOX. Gentlemen, I can just say that the department has sent this year its exhibit material in large quantities—we are frequently called upon for a very small exhibit, on a single subject—to about 30 of the large State fairs or special expositions of the country. It has renovated and improved much of its former material, and in addition has prepared two large special-subject exhibits, one on dairying, and one on animal husbandry, emphasizing the efficient utilization of feed, grain, hay, and forage crops for meat production, and the economical purchase of meat.

Mr. ANDERSON. By the consumer, you mean?

Mr. HISCOX. By the consumer; yes, sir. One of the special booths at the exhibits shown at the Grain and Hay Show of the International

Live Stock Exposition at Chicago was devoted to the economical purchase of meats. It was one in which the Secretary took a special interest, and for which, I believe, he prepared some of the copy.

We are giving considerable attention to the improvement of the old exhibit material, of which we have a great deal, which has accumulated during many years, some of it having been prepared originally for the large special expositions; some of it having been prepared for use by some of the large world fairs in other countries; and much of which is rather out of date and not related particularly to the problems of farmers to-day. What we are trying practically to do is to have our material, which heretofore has presented the work of the department in a rather neutral and negative way, presented in a positive way, and in a way which will inspire people who see it to do the practices and methods which the department and its allies, the colleges, have tested and proven to be of benefit or profit to the persons who should follow these practices.

The development of exhibits along this line during the year has proven very satisfactory, as far as we have been able to determine, to the public. Two years ago the department began, under a special appropriation which we had, to prepare a large exhibit on dairying, to be shown at the National Dairy Show.

There have been great demands for that material at other places, but before last year the nature of the material prepared was such—it was prepared a good bit of it locally, at the place of the showing, that there was not much to move around to other places; but there was a great deal of the demonstration done with little material. This year we prepared an exhibit of an entirely new type. We prepared at about half the cost of any previous national dairy exhibit, and showed one-half of it, on its way to the National Dairy Show at St. Paul, at Waterloo, Iowa, sending the other half, which was incomplete, to St. Paul, and completed it there, where it was joined by the materials shown at Waterloo.

You want me to tell you some of the details, how it has been received?

Mr. ANDERSON. We would be very glad to have it.

Mr. HISCOX. The director of the Pacific International Livestock Exposition at Portland, Oreg., and I believe the president of the Carnation Milk Co., Mr. Stuart, saw the material there at St. Paul, and insisted that he must have it for the dairy products section of their Portland exposition. We were operating under a budget prepared in the early part of the year for the allotment of our exhibit funds, and felt that we did not have the money with which it could be sent.

He was so anxious to have it that his exposition arranged to take the material from St. Paul—his exposition beginning so near the close of the St. Paul show that it could not be moved by freight—and paid the cost of its movement from St. Paul to Portland by passenger train, under an agreemtnt to return it to Washington, free of cost to the department. At Portland it was seen by the people representing the California Creameries Association who were to hold a convention in California of all the dairy interests of the Pacific coast; they solicited the use of about one-third of the material for display at their fair in Stockton. Under our appropriation we are unable to move material except to State, interstate, or national fairs. They moved that material from Portland to Stockton and agreed to move it back to

Washington, by express. It has been moved back to Madison, Wis., the Wisconsin College wishing it for use during their short course. The other part of the material, returned by baggage car to Washington, has been sent to Wisconsin, and it is going from there to Saginaw, Mich., to a meeting of the dairy people of Michigan. It may be interesting to know that that movement is arranged for entirely at no cost to the department. They are so anxious to have this new-type material that they are willing to pay all the expenses. The colleges of those States are cooperating with the department in making the necessary demonstration of the material.

Mr. **Anderson**. At how many fairs did you exhibit last year?

Mr. **Hiscox**. About 30 of the larger State fairs. We had to cut down the number of fairs to which we have sent exhibit material, as you know, because two years ago the appropriation under which we carried on this work was reduced from $100,000 to $70,000.

I notice in the statement of the printed estimates a mistake, showing that in 1921 we had $50,000 and in 1922 $70,000, indicating that we are operating the current year under an increase. That is wrong. We have been operating at a $30,000 decrease for the last two years.

Mr. **Anderson**. Both should be $70,000?

Mr. **Hiscox**. Yes; both should be $70,000.

Mr. **Chairman**. This special exhibit that I am speaking of seems to meet all the desires of all classes of people interested in dairying, including the large State fairs. We have requests for the movement of this material in the next fall, during the fair showing season, to about 15 of the largest State fairs in the country.

A similar result was reached with the special exhibit on animal husbandry, the subjects prepared for the International Livestock Exposition. The department has felt that it should perfect two special exhibits for those two places each year, because at those places largely they meet more than at any other places, the leaders of those two subjects. Presidents or other officials of agricultural colleges all over the country, seeing this material at Chicago, have wired and written the Secretary, urging that arrangements be made for it to be moved to their colleges, to be used by them in their short-course of work during the winter.

Now, I want to tell you, just to let you know of the interest in the work, that I am told repeatedly as I go around the country, not having enough money to send the material to anywhere near the number of places who desire it, by many organizations, colleges, etc., that they would be with us in a request for more money. I am telling them that I will never inaugurate a request for more money until that which we have is most efficiently expended. I am trying to arrange for its more efficient expenditure through having the State colleges, other organizations especially interested in the subjects, and the railroads cooperate in paying the expenses of movements, installations, and demonstrations, so that the fund which you gentlemen provide can be used most largely for preparation; and we are being quite successful.

COST OF TRANSPORTING EXHIBITS.

Mr. **Anderson**. Do any of those State fair associations pay any part of the expense of the exhibit for its transportation and installation?

Mr. HISCOX. During the past year every State fair at which we showed the material paid all the local costs of labor, drayage, and installation, which heretofore have ranged from $100 to $250.

Mr. ANDERSON. They do not pay any part of the transportation, outside of the drayage or cartage?

Mr. HISCOX. No. Since the appropriation was made for exhibits work they have not paid for the movement of the material, they feeling that having secured an appropriation, and its terms permitting the payment of freight, it should be paid out of such fund.

This has been done, however: Last year every movement of our material on circuit, going from State fair to State fair, except that made by baggage-car movement, which it is necessary to make occasionally, when one fair opens the day after another closes, was made by the railroads at one-half the current rate heretofore considered as applicable to our material. And every direct movement of material to only one point of showing and back to the department was made under free return. The movement of the material to the International Live Stock Show at Chicago was made free of cost to the department by the Baltimore & Ohio Railroad Co., although by baggage movement on a passenger train.

Mr. PUGSLEY. That was because the number of tickets which were purchased entitled us to a baggage car?

Mr. HISCOX. Yes, that entitled us to a baggage car. We surveyed the department and discovered all the persons who were going to or through Chicago on any kind of business for the department, and lumped their movement in a ticket, and the railroad agreed to move the material on that ticket.

Mr. PUGSLEY. Isn't that a regular rule that they have, if there are so many tickets, that they will furnish a baggage car?

Mr. HISCOX. Yes,

Mr. PUGSLEY. And it was on that basis that it was moved?

Mr. HISCOX. It was on that basis that it was moved, yes.

Now, the indications are that as we become able to prepare exhibits that are of special interest throughout the country that we will be able to arrange with the railroads to move the material at a rate still lower than that which we now pay, or possibly free. I am hopeful of being able to move the special material on passenger trains, in baggage cars, free of cost, through some cooperation through the agricultural development offices of the railroads.

Mr. PUGSLEY. May I interject there? We are asking no favors of the railroads, simply the application to our material of the regular rules that they have heretofore granted on exhibit material. Practically all of the railroads now move such exhibit material at less cost than we have been paying, and we are finding that these rules are applicable to interstate movements of our exhibit material are having them so applied.

Mr. HISCOX. This material which has gone to Madison, Wis., is being moved from Chicago to Madison, thence to Saginaw, back to Madison, and to Chicago, by the railroads west of Chicago under an agreement reached with them by the college people, free of cost, the railroads recognizing that this material develops better agriculture along their lines, and they have been willing, some of them, to move the material free.

Generally that is a statement of our work.

Mr. **Anderson**. What proportion of this sum is represented by the cost of making the exhibit? I mean preparing the exhibit.

Mr. **Hiscox**. What proportion of the sum appropriated?

Mr. **Anderson**. Yes, sir.

Mr. **Hiscox**. Well, that is a pretty difficult question to answer. I am trying to arrive at a cost process to be used in the construction work now. Roughly speaking, I would say about half. Do you mean by that, Mr. Chairman, the physical construction or the demonstration also?

Mr. **Anderson**. Well, I mean outside of transportation, the exhibit costs at various locations; I mean the preparation of the exhibit. Including the labor and material here in Washington.

Mr. **Hiscox**. Well, possibly a larger proportion than that.

Mr. **Anderson**. You estimate $19,000 this next year for traveling expenses. I do not know what these miscellaneous items are, $13,000; I just want to get at roughly what the preparation of the exhibits costs.

Mr. **Hiscox**. I might say that before this year the exhibit work of the department has been carried on largely through sending old material which it possesses, which had little done to it in the way of renovation, a very large share of the money being spent for freight and traveling expenses.

Mr. **Anderson**. Very well.

Mr. **Pugsley**. I would like to add that like all other good work, the amount of money which can be advantageously used is very much larger than the request which has been made. I think that it is being efficiently handled, as far as I have been able to go into it since it was attached to the Secretary's office.

Mr. **Anderson**. The committee will be in order. We will take up the item on page 176, library. You are asking for some increases there. Tell us why you need them, please.

Monday, February 6, 1922.

LIBRARY.

STATEMENTS OF DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK, DEPARTMENT OF AGRICULTURE, AND MISS CLARIBEL R. BARNETT, LIBRARIAN, DEPARTMENT OF AGRICULTURE.

Mr. **Ball**. Mr. Chairman, you will notice that in 11 years the appropriation for salaries for the library has increased from $25,000 to $30,000. On page 177 you will notice that in 11 years the lump-sum appropriation has increased from $15,500 to $21,400, approximately $5,000. During that period the work of the Department of Agriculture has practically doubled.

Mr. **Anderson**. Is there any necessary relation between the appropriation for the department and the library?

Mr. **Ball**. There should be. There are no absolutely fixed relations, but as the work of the department increases the calls on the library will increase, and if we fail to meet those calls it will result in less efficient work. Under the law all books for the use of the Department of Agriculture must be bought through this library appropriation, except in case of marketing. There is special provision for that.

Our purchases also include subscriptions to periodicals, the purchase of atlases and things of that kind, as well as the salaries of the assistant librarians. All of these come out of the library appropriation. If you hold down the library appropriation, you hold down the efficiency of all our work.

Of course, you all know that the cost of purchasing books and periodicals in the last three or four years has increased all out of proportion with this appropriation. The result is we are getting less in the way of supplies for the department now than we were ten years ago, with a department of twice the size that it was then. So that from the standpoint of efficiency of the whole department this is important. It is not alone for the librarian but is for the whole department. From the standpoint of the whole department service, it is important that the library appropriation be increased relatively a good deal more than it has been in the past.

It is a very modest increase we are asking for. It is very modest for both places. Neither one of them will put the library in even fair working shape, but it will make a beginning.

Just take this one example. The new census is out. Every time they get out a new census we must provide a new atlas for each division using statistical work. I don't remember the exact figures, but the cost is over twice what it was at the last 10-year period when we purchased the last atlas.

It is absolutely necessary to use these atlases in a number of our different bureaus, and their increased cost has to come out of this small library appropriation. That was the first thing that called my attention to the absolute inadequacy of our appropriation. It practicaly means we can not purchase an adequate supply of these necessary helps.

Mr. **Anderson**. How many volumes have you in the library?

Mr. **Ball**. I don't remember exactly, I haven't that information with me.

Mr. **Anderson**. I can tell you. You have very nearly 160,000.

Mr. **Ball**. The service, of course, is very much greater than our library volumes. I notice about one-third of the books I ask for comes from the Congressional Library.

Mr. **Anderson**. They have nearly 3,000,000 volumes with an appropriation in the past year of $90,000, while you have about 160,000 volumes with an appropriation of $32,000.

Mr. **Ball**. For the purchase of books?

Mr. **Anderson**. Yes.

Mr. **Ball**. In our case that $32,000 must pay for all magazine subscriptions, for the purchase of books, as well as the salaries of the librarians employed.

Mr. **Anderson**. I say the appropriation for the Library of Congress was $90,000?

Mr. **Ball**. Yes, sir.

Mr. Anderson. They have somewhere between two and a half and three million volumes?

Mr. Ball. Yes, sir.

Mr. Anderson. You have 155,000 or 160,000 volumes?

Mr. Ball. Yes, sir.

Mr. Anderson. And an appropriation of $32,000 for purchasing?

Mr. Ball. Yes, sir; but the Library of Congress gets two copies free of every copyright in the United States, which does not come to us. Of everything that is copyrighted, they get two volumes free.

Mr. Anderson. Yes; I understand that.

Mr. Ball. Our purchases are very largely of periodicals of the scientific and technical type, statistical publications and things of that kind, which are absolutely necessary for our work. This appropriation is not for books alone, but for papers, periodicals, additional assistants, fixtures, library cards. There is very little left that can be used for the purchase of books.

I can give you the details of that, but they are on my desk. I just wanted to present this generally this evening. The library appropriations have not kept pace with the increase in the department, and the result has been a serious handicap. If necessary, the librarian can come down and present these details from the standpoint of the librarian. I am presenting it to you as a departmental problem.

Mr. Anderson. According to the detailed estimate in this appropriation on page 177, there are about $12,000 for salaries and $19,000 for equipment and material.

Mr. Ball. Yes, sir. They keep up card indices and do a good deal of bibliographic work. I call over and ask them for a reference to certain lines of work, and they get that right up for me. That is what they are for, for bibliographic service, for keeping and maintaining card indices, for doing all that type of work. They are the service bureau of the whole department.

The question came up a little while ago where an outside agency asked if they could send men down here to use our laboratory and our library for study. I said yes right offhand. The librarian said, "We will have to have additional room if we do that, because we are crowded two deep now. If their men come in here and study they will have to have desks where they can open the books." That is the situation at the present time.

Mr. Wason. Where is the library?

Mr. Ball. The main library is in the Bieber Building, right across from the west wing. It is on the lower floor of that building. We expect to consolidate some of the branch libraries and the main library in this building.

Mr. Anderson. Are these other librarians paid out of this fund?

Mr. Ball. No; not the librarians, but the purchase of books has to be made out of this fund.

Mr. Anderson. According to this statement, they only pay about $500 for periodicals. I do not see any item at all, unless it be included in equipment and material.

Mr. Ball. That is included in equipment and material. That is the item. I have a detailed statement on my desk, but I didn't expect to go into that this afternoon. The librarian can come down and give you these details, if you like.

Mr. **Anderson**. If you want this money, I think you had better have her come.

Tuesday, February 7, 1922.

Mr. **Ball**. Miss Barnett will also speak about the library.

Miss **Barnett**. Perhaps I should first explain about the appropriation last year, which has a very great bearing on our estimates this year.

Last year we had 15 positions below $1,200, at salaries ranging from $840 to $1,080. It was practically impossible to fill those positions satisfactorily with people who could do our work. Aside from a few clerical positions in the library, all of our positions are filled by library-trained people, and the majority of them have college training. Of course, it is impossible to get that kind of an assistant at salaries below $1,200. Therefore, I asked to have those 15 positions dropped, and in place of them asked for 11 positions at salaries ranging from $1,200 to $1,920. I also asked to have carried on the lump sum the positions which were dropped from the statutory roll. Those to be carried on the lump sum were the assistant librarian and the heads of divisions and two cataloguers, all of whom were scientific assistants in library science, and therefore could be carried on the lump sum. In lieu of what we requested, however, 13 positions, ranging from $840 to $1,080, were dropped, and 6 positions were granted in place of them; and that meant a loss of 7 positions.

Mr. **Anderson**. There could not be a loss of seven positions if you did not have them to fill.

Miss **Barnett**. Well, that is true, too; but we had filled those positions—a good many of them—by temporary assistants. During the war we had just a series of temporary appointments. During that time we were able to get temporary assistants, because there were so many people here in Washington who, for one reason or another, were willing to accept a low salary during the war period—but it was very difficult after that to get them filled even temporarily. But, still, we had those positions previously, and up to the war period we were able to fill them, so that as far as the number of positions is concerned, this meant a loss of seven positions, and there was a decrease of $600 in the lump sum. So we were in a very bad position. In fact, in the whole course of the history of the library, we never had suffered such a loss. We had had a very gradual increase up to 1918. Only once in 20 years had we had a loss, and that was a loss of $500. The loss last year of $3,020 was a very severe blow to the library.

Mr. **Anderson**. We thought we were doing you a favor by giving you some people that you could use.

Miss **Barnett**. Well, that is so. We were most grateful for the higher positions, and I should have prefaced my remarks by an expression of appreciation for those positions; but having no increase in the lump sum was a great loss. We have only been able to get along this year by the help of the bureaus.

FOR NEW POSITIONS.

Mr. ANDERSON. You are asking this year for three additional places.

Miss BARNETT. Yes.

Mr. ANDERSON. One in each class, class three, class two, and class one.

Miss BARNETT. Yes; one $1,600 and one $1,400 and one $1,200, and then an increase on the lump sum of $10,600. That increase of lump sum is to carry six more positions; also it provides a very moderate increase in the amount for books and periodicals.

Mr. ANDERSON. How much do you spend for books and periodicals now?

Miss BARNETT. Last year we spent approximately $9,300 for books and approximately $6,000 for periodicals.

Mr. ANDERSON. $15,000 altogether.

Miss BARNETT. Yes, sir.

Mr. ANDERSON. The remainder of your appropriation, then, covers additional salaries?

Miss BARNETT. Additional salaries; yes, sir.

Mr. ANDERSON. For scientific people?

Miss BARNETT. Yes, sir; also for steel shelving, stationery, traveling expenses, and furniture.

Mr. ANDERSON. Where is the library located?

Miss BARNETT. It is in the Bieber Building, on the first floor and in the basement.

Mr. ANDERSON. How many volumes have you?

Miss BARNETT. We have 165,000.

Mr. ANDERSON. Have you room enough?

Miss BARNETT. No; we have not.

Mr. ANDERSON. You have not?

Miss BARNETT. No, sir. One of our greatest handicaps now is the lack of room. A separate building for the library is very much needed. According to the present plans, the administration building is to include the library. It is to be on the top floor, but the room that was assigned to the library, of course, would be very inadequate now. It seems to me that a building could be built between the two wings, as a kind of annex to what would be the administration building, and that it could be built more economically as an annex than as an integral part of the other building, because the library requires special equipment.

Mr. ANDERSON. Now, these scientific people that you have in the library, what do they do? Do they do research work?

Miss BARNETT. The six positions on the lump sum are for the assistant librarian and for the heads of the three divisions of the library and for two cataloguers.

Mr. ANDERSON. What divisions have you?

Miss BARNETT. We have the catalogue division, the periodical division, and the readers' division.

Mr. ANDERSON. Are there any questions that the other members of the committee would like to ask? If not, we are very much obliged to you, Miss Barnett.

Mr. ANDERSON. What is the next item, Dr. Ball? States Relations Service?

Dr. BALL. States Relations Service; yes, sir.

TUESDAY, FEBRUARY 7, 1922.

STATES RELATIONS SERVICE.

STATEMENTS OF DR. A. C. TRUE, DIRECTOR STATES RELATIONS SERVICE; DR. WALTER H. EVANS, CHIEF OF DIVISION OF INSULAR STATIONS; AND MR. C. F. LANGWORTHY, CHIEF OF OFFICE OF HOME ECONOMICS.

SALARIES.

Mr. ANDERSON. Dr. True, we will take up your statutory roll, on page 179. You are asking for some increases there, apparently?

Dr. TRUE. I might say, in general, to begin with, Mr. Chairman, that there is actually no increase in our Washington force contemplated in these estimates. In fact, since the 1st of March the Washington force of the States Relations Service has decreased by 15 persons, and there is no prospect of increasing the force in the estimates made with reference to that here.

In the statutory roll there are a few cases which, as indicated here, make an apparent increase in the statutory roll of $16,540, but an actual increase of $7,040.

That is explained in this way: We are asking for five clerks, class 3, $1,600 each, which means $8,000.

If those increases are allowed, it simply means that we will put the people on our rolls into those places. The object of getting those places is to make a better balanced statutory roll. Your committee in the past has considered that and helped us materially in that regard, and what we hoped was that you would help us a little more this year by giving us these few places at $1,600.

Mr. ANDERSON. Well, if you are going to take those people out of the places they now occupy on the lump-sum rolls, do you reduce this lump-sum fund?

Dr. TRUE. Yes; whenever we transfer clerks from the lump sum, we reduce the lump sum by that amount.

Mr. ANDERSON. But you have an actual increase here of $7,040.

Dr. TRUE. That is explained in this way: When our estimates were prepared, we had a number of lower salaried employees on our lump fund for whom it did not seem desirable to make places on the statutory roll. The force was changing, and with the contemplated consolidation of our two extension offices in the near future, it was known that further reductions would take place. It was therefore considered that by the addition of these five places at $1,600, certain adjustments could be made in the statutory roll, as a result of which places would be available for the transfer of the remaining lower salaried employees.

Mr. ANDERSON. If that is true, then this statement that there is an actual increase of $7,040 apparently is not true.

Dr. True. As far as the department as a whole is concerned, that is an actual increase, for it represents the difference between five new places at $1,600 which have been added and the omission of two messenger-boy places at $480 each.

Mr. Anderson. Well, I can not reconcile that with your statement that there is not any increase.

Dr. True. Our force will not be increased. If these changes are made, we will have no more people in the States Relations Service than we have now, for it will merely result in the transferring of the lower salaried employees at present on the lump fund for whom no provision has been made. That states that 14 new clerks with salaries aggregating $14,380 have been added. Now, that is true in the sense that there have been new places and changes of title enough to make what are called new places, technically, to the amount of $14,380.

Mr. Anderson. Then you drop 11 places?

Dr. True. Then we drop 11 places.

Mr. Anderson. $7,340?

Dr. True. Yes, sir; those have been dropped.

Mr. Anderson. And that leaves you a net increase of new places, $7,040?

Dr. True. Yes, sir; as far as the department is concerned, it amounts to a net increase of $7,040.

Mr. Anderson. Now, then, you have transferred five clerks at $1,100 to the Division of Publications. That goes out of the lump sum, however, I take it?

Dr. True. No, sir. Those places are deducted from our statutory roll.

Dr. Ball. Those are statutory places?

Dr. True. Yes, sir.

Mr. Anderson. Five clerks at $1,100?

Dr. True. Yes; those are statutory places.

Mr. Anderson. So you have 10 employees at salaries of $15,000 from the lump sum, which has been reduced, and that makes instead of an increase a decrease of about $7,000 in the total transaction, so far as the appropriations for this bureau are concerned.

Dr. True. No, sir; as far as the appropriations for this bureau are concerned, we have an actual increase of $140. That is—

5 new places at $1,600		$8,000
2 places for messenger boys at $480, dropped	$960	
5 statutory places at $1,100, transferred to Division of Publications	5,500	
1 lump fund place for machine operator at $1,400, transferred to Division of Publications	1,400	
		7,860
Net increase on bureau appropriation		140

Dr. Ball. On the statement I gave you, it comes out the same. The increase in the statutory roll is $16,540, and the decreases in the two other rolls aggregate $16,400, making a net increase for the bureau of $140.

Mr. Anderson. Well, the only way we will get this thing straightened out is for you to furnish us with a statement showing the places which are new places, if there are any, and the transfers from other funds, and the funds from which they are transferred.

Dr. **True**. Well, the actual new places, as I understand it, are these five clerks at $1,600.

Mr. **Anderson**. They are new in the sense that you are transferring them to this statutory roll at a higher rate of salary than they are now drawing. We are jumping them up from one of the other places.

Dr. **True**. Yes; they are not new places in the sense of any addition to the force, but as previously stated, they will enable us to make certain adjustments in the roll as a result of which we will transfer employees from the lump fund at their present salaries in the lower grades.

Mr. **Anderson**. Well, you certainly can give us a statement showing just what this does, and we are certainly not going to allow these changes unless you do. I am not.

Dr. **Ball**. Yes; we will give you such a statement.

Dr. **True**. I will have prepared a statement showing just what we are doing.

Dr. **Ball**. We will make a tabular statement and submit it to the committee; one column showing the additions, one column showing the subtractions, and another column showing the net increase or decrease.

Dr. **True**. Yes; I will have that done. It should be stated, however, that the five new places at $1,600 which we have requested have no relation whatever to the five places at $1,100 transferred to the Division of Publications. Those places are filled by machine operators, and had they not been transferred to that division, we would still have had urgent needs for these five clerical places at $1,600, which will be used for employees in the next lower grade.

(The statement referred to is here printed in full, as follows:)

Statutory roll of States Relations Service.

Appropriated for 1922.		Places transferred to Division of Publications or dropped.	Places added.	Estimated for 1923.	
1 director	$4,500			1 director	$4,500
1 chief clerk	2,000			1 chief clerk	2,000
1 clerk or chief accountant	2,400			1 clerk or chief accountant	2,400
1 financial clerk	2,000			1 financial clerk	2,000
1 executive clerk	1,740			1 executive clerk	1,740
1 clerk or proof reader	1,800			1 clerk or proof reader	1,800
			1 clerk, at $2,000 (transferred from farmers' cooperative demonstrations).	1 clerk	2,000
1 clerk	1,980			1 clerk	1,980
6 clerks, class 4	10,800			6 clerks, class 4	10,800
11 clerks, class 3	17,600		7 clerks, class 3 (2 transferred from farmers' cooperative demonstrations and 5 new places).	18 clerks, class 3	28,800
2 clerks, at $1,500 each	3,000			2 clerks, at $1,500 each	3,000
20 clerks, class 2	28,000		7 clerks, class 2 (2 transferred from colleges and stations, and 5 from farmers' cooperative demonstrations).	27 clerks, class 2	37,800
2 clerks, at $1,320 each	2,640			2 clerks, at $1,320 each	2,640
1 clerk	1,260			1 clerk	1,260
52 clerks, class 1	62,400			52 clerks, class 1	62,400
24 clerks, at $1,100 each	26,400	5 clerks, at $1,100, transferred to Division of Publications and 1 place changed to read 1 clerk or laboratory helper.[1]		18 clerks, at $1,100 each	19,800
2 clerks, at $1,000 each	2,000			2 clerks, at $1,000 each	2,000
1 clerk or artist draftsman	1,200			1 clerk or artist draftsman	1,200
1 clerk or machine operator	1,200			1 clerk or machine operator	1,200
			1 clerk or laboratory helper, at $1,100, change in title only.[1]	1 clerk or laboratory helper	1,100
1 messenger	1,000			1 messenger	1,000
2 skilled laborers, at $1,000	2,000			2 skilled laborers, at $1,000	2,000
2 messengers or laborers, at $840 each	1,680			2 messengers or laborers, at $840	1,680
5 messengers or laborers, at $720 each	3,600	5 messengers or laborers, at $720 each.[1]	5 messenger boys or laborers, at $720 each.[1]	5 messenger boys or laborers, at $720 each	3,600
2 messengers or laborers, at $600 each	1,200	2 messengers or laborers, at $600 each.[1]	2 messenger boys or laborers, at $600.[1]	2 messenger boys or laborers, at $600 each	1,200
1 messenger or laborer	480	1 messenger or laborer, at $480.[1]	1 messenger boy or laborer, at $480.[1]	1 messenger boy or laborer	480
4 messenger boys, at $600 each	2,400			4 messenger boys, at $600 each	2,400

[1] Changes in title only.

Statutory roll of States Relations Service—Continued.

Appropriated for 1922.		Places transferred to Division of Publications or dropped.	Places added.	Estimated for 1923.	
11 messenger boys, at $480 each	$5,280	2 messenger boys, at $480 each.		9 messenger boys, at $480 each	$4,320
4 charwomen, at $480 each	1,920			4 charwomen, at $480 each	1,920
16 charwomen, at $240 each	3,840			16 charwomen, at $240 each	3,840
Total	196,320	Total, $6,460.	Total, $23,000.	Total	212,860

The places in the "transferred or dropped" and "added" columns which represent only changes in title have not been considered in totaling the columns.

Statutory roll recommended for 1923	$212,860
Statutory roll for 1922	196,320
Apparent increase	16,540

SUMMARY.

New places, 5 clerks, class 3		$8,000
Transferred from lump funds, with corresponding reduction in those funds:		
1 clerk, $2,000, from farmers' cooperative demonstrations	$2,000	
2 clerks, class 3, from farmers' cooperative demonstrations	3,200	
7 clerks, class 2 (2 from colleges and stations and 5 from farmers' cooperative demonstrations)	9,800	
		15,000
Total		23,000
Transferred to Division of Publications from statutory roll, 5 clerks, at $1,100 each	$5,500	
Places dropped, 2 messenger boys, at $480 each	960	
		6,460
Apparent increase		16,540

The apparent increase is $16,540, of which $15,000 consists of reduction in our lump funds, leaving a difference of $1,540 to be accounted for when the appropriations of the service as a whole are considered. From this $1,540 there must be deducted one place for machine operator at $1,400, which was deducted from the lump fund for farmers' cooperative demonstrations and transferred to Division of Publications, which results in a net increase of $140 in the appropriations for this service.

FOR ESTABLISHMENT OF EXPERIMENT STATIONS.

Mr. **Anderson.** The next item is on page 180, "General expenses, States Relations Service." The amount of that appropriation is fixed by law.

Dr. **True.** Yes, sir. That is fixed by law.

Mr. **Anderson.** The item on page 181 seems to be the same.

Dr. **True.** Yes, sir; that is the same. That is what is called the Adams Act.

Now, on page 182, that is the usual appropriation which deals with the administration of experiment stations and the extension act. There there is an apparent decrease of $2,800, due to the transfer of two clerks to the statutory roll.

Mr. **Anderson.** What salaries are those clerks getting?

Dr. **True.** $1,400 each.

FOR FARMERS' COOPERATIVE DEMONSTRATION WORK.

Mr. **Anderson.** Are there any questions on this item? If not, we will take up the item on page 184. Perhaps we had better pass over the items on pages 184 and 185 and take up the item on page 186, which aparently is a combination of three of those items on pages 184 and 185.

Dr. **True.** Yes. We have combined those three items without increasing the total amount. In fact, there is an apparent decrease of $13,600, due to the transfer of eight employees to the statutory roll, and the transfer of one machine operator at $1,400 to the statutory roll, Division of Publications.

Mr. **Anderson.** What is the idea of combining those items?

Dr. **True.** As far as the first two are concerned, they relate to the farmers' cooperative demonstration work. We had in the past two extension offices in the States Relations Service one for the 15 Southern States and the other for the 33 Northern and Western States. That was the arrangement which we inherited from the time when the work was originally in the Bureau of Plant Industry. Now, that had gone on after the passage of the so-called Smith-Lever Act of 1914, until we had worked out what is truly a national system of extension work, and as time went on it became more and more embarrassing for us to have that work divided on a sectional basis. So, with the incoming of the new administration last March this matter was taken up, and it was decided to combine the two offices. The offices having been combined and the work carried by these two appropriations being of the same character, it seemed best to put those two together in one item.

As regards the third item, that on page 185, we had an appropriation under which we were doing a certain amount of work in the interest of the farmers' institutes and the agricultural schools. The work relating to the farmers' institutes is distinctly of an extension character, and the farmers' institutes have been more and more incorporated in the States with the general extension work that is carried on through agricultural colleges, though there are still a few States in which the farmers' institutes are under the State department of agriculture. We think that since this is real extension work it is on the whole desirable for it to be combined with the other item, and we can carry on the work just as well there, in fact, perhaps better, because then it will be more closely identified with the extension enterprise.

Mr. **Anderson.** Is there any difference between the work done under any of these items?

Dr. **True.** Well, in its general character there is none. Of course, when it comes to the matters relating to the farmers' institutes, as long as the appropriation was separate we tried to keep that as work related particularly to them. That is, we have made that work of a character to help farmers' institute lecturers and others, in getting for them certain publications which we thought were especially useful in their work—furnishing them with a certain amount of illustrative material, as lantern slides, etc., but it is really extension work.

Mr. **Anderson.** Well, is there any difference between the work done under this item and subsequently under the Smith-Lever law?

Dr. **True.** Well, essentially not, except so far as the work relating to the schools is concerned; that is, the work there has become essentially extension work. It started out with a different purpose, because the wording of this old item has continued the same as it was over quite a number of years. Now, all we are doing with reference to the work of instruction in agriculture is to prepare a certain number of publications which will be of use in the school work. We would like to continue that as a feature of our extension enterprise.

Mr. **Anderson.** What are these publications? Are they publications that go to the extension workers or directly to the people?

Dr. **True.** The publications with reference to the schools go chiefly to the teachers and school officers. They are quite limited, as far as their editions are concerned. We send a certain number of copies of them to the extension workers who are interested in helping schools, and they have a few to distribute to schools in their vicinity; but principally these publications for the schools go directly to teachers and school superintendents. Part of that work has been carried on in cooperation with the State departments and the agricultural colleges on the part of the State.

Mr. **Anderson.** Isn't a part of this money used to pay county agents?

Dr. **True.** You mean of this school money?

Mr. **Anderson.** All of it. You have got it all together now.

Dr. **True.** Well, now, we have got it all together; yes, sir.

Mr. **Anderson.** Is any of it used in the home-demonstration work?

Dr. **True.** Yes, sir.

Mr. **Anderson.** And the boys' and girls' club work?

Dr. **True.** Yes, sir.

Mr. **Anderson.** That was true of all of the items before except this item of $68,000. whatever it is?

Dr. **True.** Yes; that was true of the first two items.

Mr. **Anderson.** Well, we will pass this for the time being, unless there are some questions on it now. We will come back to this later.

The next item is the item on page 188, which is the so-called supplementary Smith-Lever Act item.

Dr. **True**. All of that money is allotted to the States in the same way that the money under the Smith-Lever Act is allotted.

Mr. **Anderson**. This calls for an estimate of $1,500,000.

Dr. **True**. Yes, sir; that is the same.

Mr. **Anderson**. Now, that gives you under the item we have just been discussing $1,353,280.

Dr. **True**. Yes, sir.

Mr. **Anderson**. And under this item $1,500,000?

Dr. **True**. Yes, sir.

Mr. **Anderson**. And under the Smith-Lever Act $4,580,000?

Dr. **True**. Yes, sir.

Mr. **Anderson**. That makes a total of $7,433,280?

Dr. **True**. Yes, sir.

Mr. **Anderson**. Now I should like to know how that $7,433,000 is going to be distributed as between administration, publication, specialists, county agents, home demonstration work, boys' and girls' club work; anything else that you do under it.

Dr. **True**. We can give you that for the present year. We can not tell that for the next year.

Mr. **Anderson**. All right. Let us have it for the present year.

Dr. **True**. Of course, that money is only a part of the money that is used for extension work, because, as far as this $1,500,000 is concerned and the regular money under the Smith-Lever Act, the States have to duplicate that, with the exception of $480,000, which is given to them straight, and then they add to that the other State money, so that this year there is a total of about eighteen and one-half million dollars used in extension work in the States. Now, this table which you have shows you the different funds and how they are distributed and used under the budgets agreed upon with the States for the present fiscal year.

Mr. **Anderson**. Well, this statement shows under the State Smith-Lever funds $3,600,000 and under the Federal appropriation $7,433,280.

Where does the rest of the State money come from?

Dr. **True**. You mean the money outside of the Smith-Lever Act?

Mr. **Anderson**. Yes.

Dr. **True**. Well, that is not included in this table.

Mr. **Anderson**. No; I know it isn't.

Dr. **True**. Well, that comes from the appropriations from State legislatures or from money contributed within the counties.

Mr. **Merritt**. You see the item, "all sources," that includes not only the money under our immediate supervision, but the money that the State has, which does not come within the jurisdiction of the Smith-Lever Act.

Mr. **Anderson**. You do not have any control over that at all?

Dr. **True**. No; only in a general way.

NUMBER OF COUNTY AGENTS.

Mr. **Anderson.** How many of those county agents did you have last year?

Dr. **True.** There are county agents now in about 2,065 counties—county agricultural agents.

Mr. **Anderson.** Then you have approximately from all sources about $9,000 per county, and approximately there is being spent $9,000 per county this year?

Mr. **Pugsley.** Does that mean for county agent work alone, or for home demonstration and club work, including them also?

Mr. **Anderson.** That is for all of it.

Mr. **Wason.** Is all this appropriation divided up by counties?

Mr. **Anderson.** No; apparently not.

Under these headings here you have a total of $13,823,997 from all sources for county work. Does that mean that that is all spent in the counties?

Dr. **True.** Well, no; that does not mean that it is all spent in the county. Now, here is a statement which shows how the money is spent. For county agricultural agents, $8,685,000, in round numbers; for home-demonstration agents, $2,305,000; for boys' and girls' clubs leaders in the counties, $750,000, making a total of $11,740,000 for the county workers; that is, for the workers who are located in the counties. Then for the leaders of such work—that is, those whose headquarters are at the agricultural colleges, but who spend their time largely in the counties, and not only in the counties which have agents but in counties which are not organized with agents of one class or another—there is spent $2,080,000, which, added to the other, makes $13,820,000 expended for county work.

Then there are at the agricultural colleges about 700 extension specialists, representing the different branches of agriculture, home economics, etc., who go out into the counties to aid the county agents of various classes and supplement their work. Also they work in counties where there are no agents. For them the budgets show a total of $3,355,000.

Mr. **Anderson.** Does that include traveling expenses?

Dr. **True.** Yes, sir. That includes traveling expenses. Then for publications we have $310,000, which is away below the 5 per cent allowed under the Smith-Lever Act, and for administration $1,010,000.

Mr. **Anderson.** What does administration mean?

Dr. **True.** Well, that includes expenses of the director's office, which would carry his salary and that of persons who might be associated with him in administration work.

Mr. **Anderson.** That is the State director?

Dr. **True.** The State director; yes, sir. It includes the accounting for the office and the preparation of charts and illustrative material at the college, etc.

STATE AND DISTRICT LEADERS.

Mr. **Anderson.** What do the items "Leadership in the county agents' work" and "Home demonstration work" mean? What is that for?

Dr. **True**. Those are for what we would call State leaders, or district leaders, who supervise the work of the county agents, and also go out to help them in their work and supplement it.

Mr. **Anderson**. The fact is, you have got about $7,000,000 worth of people telling $11,000,000 worth of people what to do. That is about what it amounts to.

Dr. **True**. Well, I don't think so, Mr. Anderson. Of course, if you look upon this as being merely an administrative force, in the narrow sense of the term, that would be true, but that is not the fact; those people are helping to more thoroughly organize the work in the counties. They do a considerable amount of the actual extension work.

Mr. **Anderson**. Yes; they run around the country to county fairs, watching horse races.

Dr. **True**. Well, I don't know that they do that, incidentally.

Mr. **Pugsley**. May I add a statement?

Mr. **Anderson**. Surely.

Mr. **Pugsley**. The people who are hired under the funds that you spoke of, as people who are directing others, are really not directing others in the sense you have in mind, I think. That is, acting as their bosses. I am speaking now from an experience of seven years as an extension director in Nebraska, and the experience of several years immediately following that, in which I observed the work from the outside. All those who are hired as specialists do no directing of the county agents at all. They are merely assisting the county agents in the work. The county agent can not be a specialist in every line of work. His job is often to get the farmers in need of information in contact with the man who has the information. It necessarily must be that way, because the farmers are becoming better trained in general lines of work and they must have more detailed and special instructions. Therefore, from the technical departments of the colleges and of the Department of Agriculture, there must be people available who are trained in the technical work such as soils, crops, diseases of plants, home economics, etc. Specialists are also needed who are also trained in extension teaching methods.

These people are subject to the call of the county agents when there is a problem in the county which they can not solve; also when they are arranging special meetings or demonstrations. A very large part of the money is spent for work of that sort rather than for administration.

Mr. **Anderson**. No. I say it is top heavy on specialists and leaders and getting more so every year.

Mr. **Pugsley**. I agree with you that overhead administration should be cut to the minimum, but I think that a weakness of the extension work, is that we do not have enough specialists to assist the agents in the field. I believe that the work would be more effective and the money would be better spent if we would take some of the money that has gone into the poorest agents trained and put it into trained specialists who would be assistants in the field. They would be more highly trained men for special work, and you could get better results among the farmers. The farmers are growing to feel that way also, as they become better acquainted with the work. This does not mean that specialists should take the place of agents by any means, but should be supplemental.

Dr. **Ball.** Let me give you one illustration, if I may, that I observed in the State of Iowa. The extension division hired a specialist in the spraying of fruit trees; two of them, in fact, in different lines.

Through the county agent they arranged to have farmers from all the different sections gather in a little place here in the forenoon, another little place over here in the afternoon, and the next morning over here, and so on. These men went around for two years giving actual spraying demonstrations in practically every orchard community in that State. At the end of three years they had three times as many sprayed orchards in the State of Iowa than ever before. In a period of two years of demonstration work they practically revolutionized the handling of the orchards. They went around and did the spraying and then went back afterwards and checked up on the results, and at the time the apples were harvested in the fall they had another gathering of the farmers. They inspected an orchard that was sprayed and an orchard that was not sprayed, compared things, and brought them home, and there was almost a revolution there. When I went in there they didn't have an extension man.

They didn't have any money for one. As State entomologist I saw an opportunity for some good work, and out of my funds I hired a man and turned him over to the State agent. I said to the State agent, "Any time you have difficulty we will furnish you a man for your work." There was an outbreak of the army worm there and that man went day and night for a month or six weeks. They had one meeting after another, and they went right on a man's farm and showed him how to handle his army worm, and every other man was watching it; they went home and watched their army worms. That work went on right across the State of Iowa, so that we soon had the farmers controlling the army worms as they were never controlled before. That was because we had sent a specialist into that community. But he could not have done it himself. It was only because we had the county agent in every county in the States, and this county agent, through his contact with the farmers, got these farmers out; but the county agent could not have done the work alone; he could not have handled the army worm. He was not a specialist on the army worm. This was a new outbreak that had not occurred before. This man could not have put on this demonstration. He did not have the details worked out. It was the specialist that did that.

Mr. **Pugsley.** On the other hand, if it had not been for the county agent to determine that something was wrong there, the specialist could not have rendered the service that he did, because there would have been nobody to get the farmers together, and nobody to bring the specialist in. You will find that the work in the States, out in the counties, depends first upon somebody being in the county who has organized the farmers and worked with them, and who has a fund of information that is very helpful to the farmers in a large number of cases, but who also has contact with the agricultural college and can organize the farmers to bring in these people who know more about details and can give the proper instructions.

Mr. **Anderson.** Are these men employed by colleges?

Mr. PUGSLEY. Most of them are, but some are employed cooperatively.

Dr. BALL. I think the chairman's criticism was possibly directed more at the boys' and girls' club leaders and things like that, which you are combining and reducing.

Mr. PUGSLEY. Yes. We are doing away with duplication administration by reorganizing our extension office here at Washington.

Dr. BALL. I think you are right in that criticism. Mr. Pugsley has seen that and has combined them, doing away with the supervising leadership. And he has substituted for it more of the other type; getting the actual specialist right down to the farmer who needs him.

Dr. TRUE. During the past year or two very much progress has been made in systematizing the work of these specialists, and making it more effective, so that now there is much closer coordination of the work with that of the county workers, and careful programs of work are being made in the counties, so as to have the time and energy of both the county workers and the specialists minimized as much as possible.

Mr. PUGSLEY. The economical method of handling this sort of work is to have some person who is exceptionally well trained along one line to send where there is a real need of that sort of work, rather than to have a person trained, to be in each county, along every line of work. It is impossible for one person to be trained along all lines.

Mr. ANDERSON. I know, but he can not have a lot of fellows sitting up here in these colleges waiting for somebody to tell them that army worms are down in Iowa.

Mr. PUGSLEY. That is true; but they are not sitting around there. They have many more calls than they can fill.

Dr. BALL. Oh, they are working, and working right straight along on definite projects of development work which they are carrying out. When an outbreak comes every one of these men is ready and available at the time, but they are continually working on some piece of development work.

Mr. ANDERSON. Well, I still think that this thing is top-heavy; when you are spending $7,000,000 for leadership and $8,000,000 for work in the county, then, whatever it is, it is top-heavy.

Mr. PUGSLEY. I do not believe you are spending $7,000,000 for leadership, if I understand the figures. A very small amount of that is for real administration and leadership. The rest of it is for these specially trained people, who are conducting demonstrations.

LEADERS OF BOYS' AND GIRLS' CLUBS.

Mr. ANDERSON. Now, you know all about this thing. Tell me why it is necessary to have $615,000 in leadership as against $752,000 for county extension work in the boys' and girls' club proposition?

Mr. PUGSLEY. Is there any such situation as that, Dr. True?

Dr. TRUE. This is the situation with reference to that: There are special club leaders in only about 200 counties. At the same time, there has been organized a company of young people amounting to a half million, most of whom are in counties where there is no county club leader, and that organization does not represent by any means the full extent of the work, because many of the children are reached who are not actually organized in the clubs. Now, these State club leaders go out into the counties where there is club work to be done and follow that up, in the absence of county club workers. It is a big enterprise.

Mr. **Anderson**. Well, the county agents of these counties are organizing the boys' and girls' clubs all the time—at least, they do in my district. We have to have people go down there and tell them how to do it.

Dr. **True**. They are the head of that work, but the county agent, as you know, has a great variety of work to do, and if he were left simply to himself with regard to the club work, there would not be near as much club work done as there is now under this arrangement, by which he has the active assistance of the leaders.

Mr. **Pugsley**. If I might give you an illustration of how it works—you asked me to speak from my experience—I recall that we had a so-called State leader of boys' and girls' clubs when I was extension director. That State leader had about two assistants who would be charged under this administrative fund. We had in the State not more than three or four county club workers employed in the counties devoting full time to each county; but we had in the neighborhood of 150,000 boys and girls in the club work.

Now, those people who were charged to the administrative work were actually doing the same work that the boys' and girls' club agents were doing in the counties, but were spreading this over more than one county; so that they were not doing leadership work except in these few counties where the agents were located permanently. They were actually doing the same sort of work in other counties, except that they were not assigned to any special county, but were being sent where they could best do the work. You will find that the same situation exists with a large number of these other workers outside of the boys' and girls' clubs. The same thing would be true of some of the county agent leaders and some of the home demonstration leaders.

Dr. **Ball**. All of the time of the demonstration, for instance, in the State of Pennsylvania, would be charged to the State leaders, because they are not assigned to a county. They all work out of a center.

Mr. **Anderson**. You have got 700 specialists?

Mr. **Pugsley**. Administrators, specialists, and agents covering more than a county. I imagine there are not enough actual specialists in the list, Mr. Chairman.

Mr. **Anderson**. And it never would be, I imagine.

Mr. **Pugsley**. Probably not; but it is certainly not now enough to supply the demand that is coming from the farmers for special types of work along special lines.

Mr. **Anderson**. How many people have you employed under this leadership item of $861,000—county agent work?

Mr. **Merritt**. About 200.

Mr. **Anderson**. And how many under the leadership for home demonstrations?

Mr. **Merritt**. About 145.

Mr. **Anderson**. And in boys and girls' club work?

Mr. **Merritt**. One hundred and ten.

Mr. **Anderson**. That is approximately 1,155 as against 2,000 county agents.

Mr. **Merritt.** Yes, sir.

Mr. **Anderson.** How much money do you figure you will have under next year's appropriation?

Dr. **True.** Next year the Smith-Lever Act goes to its maximum, and that means, as far as that act is concerned, an increase of $500,000 in Federal appropriation. Now, whether the States and counties will add anything to that I do not know, except in the light of past experience. In the past number of years the total increase in extension has been from one million and a half to two million dollars. For the current fiscal year we have in already for the extension work about $1,650,000 more than we had the previous year. Of course, of that, a half million dollars came from Federal sources and the rest of it came from sources within the State, very largely from the counties. In spite of the economic depression we have increased somewhat the number of counties having county agricultural agents.

Mr. **Anderson.** They have done what?

NUMBER OF COUNTIES HAVING AGENTS.

Dr. **True.** We have increased somewhat the number of counties having county agricultural agents. There has, however, been a falling off in the number of home demonstration agents and the club agents, but the number of counties—at least partially organized—is larger now than it has been for a number of years.

Mr. **Anderson.** Are there not a good many cases in which they had county agents last year where they did not have any this year?

Dr. **True.** Oh, there is here and there a case, but take the sum total, we have an increased number of counties.

Mr. **Anderson.** How much?

Dr. **True.** About 30 or 40, I think.

Mr. **Merritt.** Compared with a year ago, it is 42 more.

Mr. **Anderson.** What was it last year?

Mr. **Merritt.** January 1, last year, it was 2,023. This year, January 1, it was 2,065.

Mr. **Anderson.** Are there any States in which the counties or the States are not contributing, where you are bearing the entire expense of the agent?

Mr. **Pugsley.** There are no counties where the Government is bearing the entire expense of the work of the counties?

Dr. **True.** No. The amount that is going into the county for the county agricultural agent is, on an average, perhaps a thousand dollars.

Mr. **Pugsley.** It is not less than that?

Dr. **True.** It may be less than that.

Dr. **Ball.** Yes; it would not be over $500.

Mr. **Anderson.** What is the average salary of the county agent?

Dr. **True.** It is about $2,500—$2,700, I think.

Mr. **Pugsley.** The Federal Government contributes the least, the State next, and the counties next, toward the work in the counties. The county is the highest contributor, right where the work is done. We feel that is the only safe way to conduct the work, because if the people on the ground are not willing to put up the money they are not ready for the work.

Mr. **Anderson**. Well, I do not disagree with that at all. I wish you would tell us something about how this is organized in the States.

Dr. **True**. How the extension organization is?

Mr. **Anderson**. Yes.

Dr. **True**. We have, of course, the State college in charge of the work, with the extension director, who is the joint representative of the college and the department, who has charge of all the work. Then, under his immediate direction are these leaders and specialists and others, whose headquarters are at the college.

Mr. **Anderson**. Do those leaders and specialists give all of their time to this extension work?

Dr. **True**. There are in the whole force, as I remember the figures now, 540 part-time employees. In some cases it is not necessary—it has not been deemed necessary so far to employ the full time of the specialist, so he spends half of his time, more or less, according to the agreement, and his salary is made proportionate to that. The rest of the time he gives to experiment-station work or to the college teaching.

Mr. **Pugsley**. That is quite desirable too, where an arrangement can be made that way, because it keeps the specialist up to date on new methods. He is devoting some of his time to actual research work in the line that he is engaged in in the extension work out in the field.

Mr. **Anderson**. The principal advantage apparently is with most of these 50–50 propositions; it increases the salary of the people engaged in them.

Mr. **Pugsley**. That was true as far as Nebraska was concerned. All the colleges have their scale of salaries and they hold the extension people down to the same salaries within the college that the other force is held to.

Mr. **Anderson**. That may be the case in Nebraska, but I doubt if it is true as a general proposition.

Mr. **Pugsley**. I think you will find it true with most colleges. It is not true with county workers, because they are on an independent basis there. Where the Government says it will put in $500 and the State says it will put in $500 or $1,000, and then the county has its fund, it can pay whatever salary it desires to get the man it wants.

Dr. **Ball**. There are counties in many States that pay more for county agents than the director of extension gets.

Mr. **Pugsley**. Oh, yes; many of them; but those who are working out from the central plant, the agricultural college, have their salaries held on an average with the others at the college. You could not put them above, whether it is a 50–50 proposition or not.

Mr. **Anderson**. I know, but it helps to raise the whole standard of salaries, all of them down the line.

Dr. **Ball**. But the salary is provided for, and it can not be more than a certain amount.

Mr. **Anderson**. Oh, that may be true in isolated cases.

Mr. **Pugsley**. That is generally true, I think.

Mr. **Anderson**. It is not true in my district.

Dr. **Ball**. The average salary of the county agent in Illinois is $3,900. That State has two former extension directors of other

States who are now county agents. It was able to take the State extension directors and pay them enough to attract them as county agents.

Mr. Anderson. Of course, you know that you can not draw conclusions from isolated cases of that sort as well as I do.

Dr. Ball. Yes; but then that is true. The highest relative payment is in the counties.

Mr. Anderson. What is your average salary for your specialists in this work?

Dr. Ball. In the colleges?

Mr. Anderson. I mean that are paid out of this appropriation.

Mr. Pugsley. Do you mean the specialists or the county agents?

Mr. Anderson. The specialists.

Dr. True. I should say about $3,000. That is probably just about the same average as you would find with reference to the full professors in the agricultural colleges.

Mr. Anderson. What salary do you pay the State directors? Does that vary?

Dr. True. The State directors get more than that, as a rule. They get from $3,000 up to as much as $5,000.

Mr. Pugsley. They get about the same salary as the director of the experiment station. We must remember that the colleges pay most of their salaries and fix the amount. We only pay a small amount with Federal funds.

Mr. Wason. $5,000?

Mr. Pugsley. A few of them may get that much.

Dr. True. Yes; only a few get that much.

Mr. Wason. Well, what do they get?

Mr. Pugsley. They are ranging from $3,000 or $3,500 up to $5,000. Not many of them receive $5,000.

Dr. Ball. That is exceptional.

Mr. Pugsley. Yes. Very few of them receive more than $4,500; many less. I do not know the figures exactly; but I suppose that out of the 48 States—this is just a rough guess, but my guess is that not half of them are receiving $4,000 a year.

Dr. Ball. No; I don't think so. The specialists, according to this, get $5,000 for salary and traveling expenses per year. The traveling expenses of a man who is traveling a whole year are usually figured as much as his salary.

Mr. Anderson. Dr. True says that most of these people do not travel more than half of the time.

Dr. Ball. But we figure traveling expenses would be about equal to the salary on that basis.

Mr. Anderson. Have these salary scales increased in the last two or three years?

Dr. True. I should say that during the last year they have not increased; before that time they were increasing, but the movement has practically stopped.

Mr. Magee. Who fixes the salaries?

Dr. True. The salaries in the States are fixed at the college.

Mr. Magee. I mean as far as Federal money is concerned—the appropriations that we make.

Dr. True. Well, the plan followed is this: That the salaries are reported to us by the State extension director, and unless there is something exceptional about them we approve those salaries. Those may be made up partly of Federal funds, directly appropriated to the department, and for that reason they are submitted to us.

Mr. **Magee.** And approved?

Dr. **True.** And approved.

Mr. **Wason.** Does the director of the experiment station appoint the State directors?

Dr. **True.** No, sir; they are appointed by the president and board of trustees of the college. The extension director is an officer separate from the station director.

Mr. **Anderson.** How many county home-demonstration agents have you?

Dr. **True.** In January, 1922, there were 710, according to our records.

Mr. **Anderson.** Then you have some county agents doing boys' and girls' club work exclusively?

Dr. **True.** We have about 200.

FOR EXPERIMENTAL STATIONS OUTSIDE CONTINENTAL UNITED STATES.

Mr. **Anderson.** We will take up the item on page 189.

Dr. **True.** Now that item relates to the stations in Alaska and the insular possessions. Dr. Evans, who has charge of that work, is here, and perhaps it will save your time to ask him questions in detail about that. There is no increase of appropriations. The items are just the same as they were last year.

Mr. **Anderson.** There is no change in that item?

Dr. **True.** No, sir.

Mr. **Anderson.** How are these experiment stations getting along?

Dr. **True.** Dr. Evans can explain that more definitely than I can, perhaps, and more satisfactorily.

Mr. **Anderson.** You seem to think that some of these were having pretty hard pickings last year, Doctor.

Dr. **Evans.** The insular stations are trying to keep their work going within their resources, and I think they are doing pretty well, with the possible exception of one that I may mention later.

ALASKA.

There are, as I have frequently said, five stations in Alaska, the headquarters station at Sitka; one at Rampart, on the Yukon River, at latitude 65° 30′, almost to the Arctic Circle; one at Fairbanks, on the Tanana River, at the end of the railroad that is being built from Seward to the interior of Alaska; one at Matanuska, about halfway between the coast and the interior; and one at Kodiak, on the coast of southwestern Alaska.

The work of these stations is along the line of developing a kind of agriculture that is suited to Alaska, and I think that very satisfactory progress has been made under the circumstances. In the interior of Alaska the principal line of investigation for the past few years has been that of grain breeding; and I am very glad to be able to report to the committee that during the last year, the year of 1921, there was grown in the Tanana Valley about 3,500 bushels of wheat from one selection made by our experiment stations.

It was developed at the Rampart station and taken from there to the Fairbanks station, where it was grown on a field scale and later distributed to farmers. That grain yielded about 27 bushels to the acre. It is spring wheat, derived from a small sample of seed from Siberia brought in in 1914. As a result of the work that has been in progress in the Fairbanks region, there has been established a cooperative mill of about 25-barrel capacity that is producing wheat flour. Only yesterday I received a sample of the flour from the Fairbanks station, and turned it over to the Bureau of Chemistry of the department for a test in comparison with a standard flour. That bureau will make various baking and other tests and give me the results of it in a short time.

In addition to the grain investigations in the interior of Alaska, particularly at Fairbanks, work was begun with live stock last year. We took in some improved cattle and some hogs and a few milch goats. The object of this is to try to develop stock breeding in the interior of Alaska, so that agriculture will not be wholly one-sided.

We found considerable difficulty in winter housing, but that is something that has to be worked out. This will be the second winter those cattle have been in the interior, and the problems in connection with the wintering of the stock are being determined.

The Canadian Government last spring gave us a pair of yak. These are to be crossed with domestic cattle, to see if a hardy beef type of cattle can be produced which can stand the winters of the interior of Alaska without any unusual protection in the way of stabling and feeding. In order to make anything out of the experiment, however, we ought to have more than one pair. The generations will be coming on so slowly that it will be a great many years before we will know the result of this experiment unless we can get funds enough to increase the herd and have the progeny coming on more rapidly. Our work at Kodiak has been that of live-stock breeding, and we have demonstrated that on the southwest coast of Alaska live-stock raising can be made a success, by pasturing the cattle during the summer season and feeding them during the winter season on silage and hay produced locally. We have kept at Kodiak, with the exception of two years after the fall of ash from the explosion of Mount Katmai, a herd of Galoway cattle that increased to about 60 head. Then tuberculosis got into the herd and we had to kill quite a number of them. Our herd at the present time is about 40, but we have no tuberculosis and we have raised 12 calves from tuberculin reacting mothers and they have not reacted, although tested three or four times. That has made a very thorough demonstration of the fact that you can raise from tubercular dams sound calves if you will take them away from the dams early and feed them milk that has been pasteurized by the ordinary pasteurization process.

At Matanuska a station has been located along the line of the new railroad. There they are combining both grain work and stock breeding. Some of the Galoway cattle from the Kodiak station were sent to Matanuska and also some milking shorthorns were purchased, and we are expecting to develop a dairy industry in the Matanuska and Susitna Valleys.

The work at the headquarters' station at Sitka is largely that of small gardening and trucking, work suited to the region, because level areas in southeastern Alaska are small. There are not very many flat areas capable of extensive cultivation on account of the very mountainous character of the country, but there are around all the villages a great many small tracts that are being used as truck gardens, where vegetables and small fruits are grown. During the past fall I received a package of seedling varieties of potatoes that were produced at the Sitka station, and they were equal to any potatoes that I had seen in a good many years. The department specialists thought very highly of them, and cooking tests showed that they were of very superior flavor, indicating that potatoes of good quality can be developed and grown under Alaska conditions.

The stations have a large fund of information as to the work that has been done, and have asked for increased appropriations several times in order to carry on some extension work. There is no extension work being done in Alaska now because we have had no funds. The Smith-Lever Act does not apply to any of the insular stations. We requested last year and the year before, and we made a request this year, for funds to carry on extension work, because of the fact that practically all of the settlers in Alaska were not farmers when they took up their settlements. Originally they were trappers, gold miners, fishermen, following all sorts of occupations except farming. Although some of them do fairly well in a way, they need some more directing than it has been possible to give them.

The building situation of the Alaska stations is one that was called to your attention last year, and I want to reiterate again that our buildings are falling down. Dr. Georgeson in a letter I have here says that the foundation under the log house at Fairbanks caved in during the summer and they have it propped up with poles.

Mr. **Anderson.** Did it kill anybody?

Dr. **Evans.** No. Fortunately it did not have very far to fall and it went down slowly. The buildings were built of green cottonwood logs in 1907. The cellar walls were nothing but logs laid crib fashion and they have rotted and given away during the summer. Dr. Georgeson in his letter says that the foundation has given way completely and will have to be repaired, that the old log cottage has been repaired in part during the present fiscal year, and it will take at least $400 to put it in anything like a decent condition. He submitted estimates for additional buildings not only at Fairbanks but at Matanuska, in order to take care of the stock that we are seeking to develop in that country, and also to have some place habitable for the station men who live in these isolated places. There are no other houses near and so far the station has only had these log houses, which were built from time to time with the proceeds from the sales—funds which we were formerly allowed to use. These log houses were practically all built by the station men during the winter season. When they were not actually engaged in the fieldwork during the summer they cut the timber and put up the buildings, doing all the work.

Mr. **Magee.** I suppose a log house in that country would be as comfortable as any you could find?

Dr. **Evans.** It is comfortable. We went to the Tanana Valley in pioneer days and constructed temporary buildings of green cottonwood logs. Cottonwood will not last long under any circumstances, and when it is built, particularly as this one house I have mentioned, with a crib cellar of green logs, the floor has settled to such an extent that now the door between the two rooms will not close. That is the condition I told the committee about last year, that the floor had sagged to such an extent that the interior doors could not be closed.

Mr. Magee. What fuel do they use there?

Dr. Evans. Wood. They use wood that the station men cut during the winter season. During the time when there is no other work or after they get through with the crop work, they repair the buildings as well as they can and carry on different improvements of building, fencing, and things of that kind.

FOR NEW BARN AND DWELLING.

Mr. Anderson. How much money would it take to put those buildings into decent state of repair?

Dr. Evans. Dr. Georgeson has estimated for some new buildings, and he said it will cost $8,000 to build a five-room cottage at Fairbanks, and he says we need a barn there and he has estimated the barn at $8,000; but that is probably below the actual cost.

Mr. Magee. For a barn?

Dr. Evans. Yes, sir.

Mr. Magee. $8,000 for a barn is more money than is put into a barn here, is it not?

Dr. Evans. Well, in the first place, if we are going to construct it we want a well-constructed, sanitary barn that will be suited to experimental work.

Mr. Magee. What are they fooling around with up there, anyway, in that climate?

Dr. Evans. We have been growing practically everything that you can grow in the northern portions of the United States, wheat, oats, rye, barley, peas, turnips, and potatoes.

Mr. Magee. You mean as an experiment?

Dr. Evans. No, sir. Three thousand five hundred bushels of wheat were grown in the Tanana Valley last fall.

Mr. Magee. By the Eskimos?

Dr. Evans. There are no Eskimos in the Tanana Valley.

Mr. Magee. What nationality are they?

Dr. Evans. Americans; white people.

Mr. Anderson. How many farms are there?

Dr. Evans. According to the last census there are 5,286 persons engaged in agricultural pursuits on 364 farms, on which homestead requirements have been completed.

Mr. Anderson. Are they grouped together?

Dr. Evans. No; they are scattered. Probably most of them are in the Tanana and Metanuska Valleys. The opening of the Government railroad, which is practically complete with the exception of a bridge across the Tanana River, and the conversion of the narrow-gauge railroad from Nenana to Fairbanks to standard guage, will complete the railroad from Seward to Fairbanks, nearly 500 miles, and when that is completed it will open up a considerable quantity of agricultural land. The various people I have talked with from there say that there is going to be a great development. One of them the other day said that he thinks there is going to be a considerable agricultural development along the line of that railroad in the very near future. At the present time in the Tanana Valley they are not raising as much wheat as they could under the circumstances and they have to ship in flour from Seattle. But there is no reason why they should not raise all the wheat and make all the flour that they need right there.

Mr. MAGEE. What I was getting at was the purpose of the Government in that work there. What is the idea—to encourage farming?

Dr. EVANS. To encourage farming and to supplement any other industry that may develop. You know that Alaska has paid for itself many times over in gold from furs and fish.

Mr. MAGEE. Have you asked for $8,000 for a house and $8,000 for a barn, which you say they will cost?

Dr. EVANS. That is the estimate that I have received.

Mr. MAGEE. Is that estimate in here?

Dr. EVANS. That is not included.

Mr. MAGEE. You hardly expected it would be?

Dr. EVANS. I sincerely hoped it would, for the reason that we have been urging some buildings up there for several years.

Mr. MAGEE. To my mind I do not know where we will land if we are going to spend a large amount of money in every quarter of our possessions trying to encourage the growth of something.

Mr. ANDERSON. You have three stations up there?

Dr. EVANS. No; five.

Mr. ANDERSON. Would it not be advantageous to cut off a couple of those stations and concentrate your efforts on three stations?

Dr. EVANS. The conditions are so unlike at the different stations, I do not think it would be practicable.

Mr. ANDERSON. But with 300 or 400 farmers, it seems like there might be some concentration up there.

Dr. TRUE. I do not think we ought to look at it in that way, Mr. Anderson. We are discovering, we are investigating agricultural possibilities in Alaska.

Mr. ANDERSON. But you can not do it all over Alaska with $70,000. We might as well settle that, first and last.

Dr. TRUE. We are not trying to do it. We have selected a few places, and the census has shown that the population of Alaska has declined, in a general way, because the earlier form of mining has not panned out as well as it used to. But now, with the completion of the Alaska Railroad and the opening of coal mines, there will be something doing. What we are doing is providing a foundation for the future development of Alaska along agricultural lines. There is not any reason, so far as I understand the matter, why Alaska should not support a considerable population of hardy, independent people such as you find in Norway and Sweden and those northern countries generally, and with the resources that are there they should develop a very large amount of wealth. Now, they can not do that to best advantage unless they are able to maintain themselves, as far as their supplies of food and fodder are concerned to a large extent. If they have got to ship everything in there, at very high cost from long distances, they will not be able to develop their industries as well as if they had a certain number of farmers going in there to supply the food and fodder.

Mr. **Anderson.** Do you think the five stations that are falling down and going to pieces are better than two or three that could stand up?

Dr. **True.** We do not feel that way, Mr. Anderson. We are asking for buildings which will be comparable with the real need. Of course, we are going on with our work; we have not cut off any work.

Mr. **Magee.** You take the stress that the farmers in this country are laboring under to-day, and then you ask for an appropriation of $8,000 to build a barn away up in some remote spot in Alaska. I may not know anything about this proposition, but I can not understand it.

Dr. **Evans.** This is not an ordinary farm barn; it is an experiment station barn. I do not imagine that there are very many experiment stations——

Mr. **Magee** (interposing). Well, I was born and brought up in the Genesee Valley, in the garden of the State of New York, and when I was a boy——

Dr. **Evans** (interposing). The Geneva and Cornell Experiment Stations have barns which cost a great deal more.

Mr. **Magee.** When I was a boy we built our own barns on the farm, and if we could get $500 to put up a barn to store the grain, we thought we were pretty fortunate. Now, to ask for $8,000 appropriation in a bill at this time to build an old barn somewhere away from nowhere up in Alaska, may seem like a reasonable proposition to you distinguished gentlemen, but from my experience on the farm, remembering back as I do, without critizing at all in any way, shape, or manner, it strikes me, especially in these financial times, as a most ridiculous proposition.

Dr. **Evans.** It is the expectation if we ever get the funds, to build a barn that will be capable not only of storing grain in but will also house the stock and permit experiments in dairying, feeding, breeding, etc. It has got to be built more substantially than in other places on account of the rigors of the winter.

Mr. **Magee.** What is the length of the summer season up there?

Dr. **Evans.** It begins in May and there is usually an open season from frost until September.

Mr. **Magee.** Is not that a pretty short season to grow grain and crops?

Dr. **Evans.** It has not proved so. We have matured a majority of our crops every year since the establishment of stations at Fairbanks and Rampart in 1907.

Mr. **Magee.** What do you grow?

Dr. **Evans.** Spring wheat and other spring grains and root crops.

Mr. **Magee.** And wheat, barley, and corn?

Dr. **Evans.** No; no corn of any kind. Corn will not grow in the high latitudes, but the other small grains are raised.

Mr. **Magee.** Like what, for instance?

Dr. **Evans.** Oats, barley, wheat, and rye.

Dr. **True.** The days up there are longer than they are farther south.

Mr. **Magee.** From May to September seems rather a short time to grow a crop.

Dr. **Evans.** One hundred and ten days is about all that are required for a spring crop anywhere.

Mr. **Wason**. I do not understand about this barn. How large a barn is it?

Dr. **Evans**. Not having had much prospect of an appropriation, we have not got the details of it, but it is hoped that we will have a barn to house probably 30 or 40 head of stock and care for the grain and hay necessary to feed them. That will take considerable of a barn.

Mr. **Wason**. Oh, about 120 feet long and 40 feet wide would do it, I think. It would be of wood?

Dr. **Evans**. It would probably have a concrete cellar and foundation, and the rest of it would probably be wood, building with double walls in order to get it as warm as possible.

Mr. **Wason**. The lumber is right there handy?

Dr. **Evans**. It is very poor lumber and very expensive, what there is. Ordinary spruce lumber at Fairbanks will cost in the neighborhood of $80 to $100 a thousand.

Mr. **Anderson**. Labor is very high, too?

Dr. **Evans**. Yes, sir; labor is very high, exceedingly high. In the summer time for ordinary farm labor we have to pay $6, 7, and $7.50 a day.

Mr. **Anderson**. It is pretty hard to farm at that rate?

Dr. **Evans**. It is pretty good for the fellow who is doing the work.

Mr. **Wason**. These settlers up there, numbering about 700, were they farmers when they went up there?

Dr. **Evans**. They were practically all gold prospectors, fishermen, and trappers—anything but farmers. That is why we want funds to carry on extension work in agriculture.

Mr. **Wason**. Oh, I see. You want to educate them.

Dr. **Evans**. We want to have a man go around from valley to valley and from settlement to settlement—most of these people are centered along the railroad and in the valleys; and we want a man to educate them, show them what to do and how to do it, introducing a new grade of wheat which already has been spread through the settlement around Fairbanks, because the people were able to come and see it, but people 200 miles away from there know nothing about it, because they can not get to the Fairbanks station.

Mr. **Wason**. Your appropriation for Alaska, according to your figures, would amount to about $100 per family of settlers?

Dr. **Evans**. Those are not the only people engaged in agricultural pursuits, not in the way you mean. There are a good many farms that have been patented, and the homestead laws have been complied with to the full extent. A great many others have farms, and there are many gardens around the mining camps.

HAWAII.

Mr. **Anderson**. Let us take Hawaii.

Dr. **Evans**. In Hawaii the situation is somewhat more favorable in some ways. The only trouble we have in Hawaii is to keep the men at the salaries we can pay. According to the estimates there is no increase asked for, although we would like to have some additional funds to carry on more extension work in Hawaii than what we have now, particularly along the line of home-demonstration work. There is practically nothing being done in Hawaii in that respect. We had a woman on part time during a portion of last year. She has given two days a week to the work, and we would like to put her on full time, carrying on the work on the island of Oahu in and around Honolulu, where the largest proportion of the population of Hawaii is located, to teach those people how to make use of local products rather than depend on materials that are brought from California and sold through the stores. There are times when there is a large surplus of products allowed to go to waste, and we have been trying to show them how to utilize it.

Mr. **Anderson**. What are you working on in Hawaii?

Dr. **Evans**. In Hawaii our work in the last few years has been diversified agriculture, largely horticultural pursuits, experiments on pineapples, rice, forage crops, potatoes, and some attention has been given to the diseases of some of the more important crops, but that work was terminated a short time ago by the Hawaiian Sugar Planters' Association taking our pathologist and doubling his salary. We have not been able to get one since. We have been an excellent training school. We have succeeded in boosting the salary of every fellow in the last four or five years. There is not a man except the agronomist in charge who was with the station for four years who has not gone elsewhere, and some have more than doubled their previous salaries.

One line of work that we have been very successful in is in connection with homesteading. On the island of Maui we carried on demonstration work for a number of years, and showed that it was possible, although it had always been considered impossible, for a man to make a living, if he wished to do so, on a 40-acre tract of land. We had a very competent man who took up a tract of land and developed it to a high state of fertility. He grew crops and made a living for himself and his family and demonstrated that it was perfectly feasible on a 40-acre tract of land, without irrigation, to grow crops sufficient to make himself practically self-supporting.

Mr. **Anderson**. Is there any real agriculture in Hawaii outside of the large plantations?

Dr. **Evans**. There is quite a good deal of agriculture, aside from sugar and pineapples, on the island of Hawaii and part of the island of Oahu and on the island of Maui. This new Hawaiian settlement scheme that has just been begun is carrying on its work on the island of Molokai. They are expecting in all these smaller places to devote themselves not to the large industries like pineapples and sugar cane, but to diversified agriculture, growing material for important consumption at home.

PORTO RICO.

Mr. **Anderson**. Tell us something about Porto Rico.

Dr. **Evans**. In Porto Rico the situation is about the same as in Hawaii. Our work there is largely with forage plants and horticultural products of various kinds, plant breeding and live-stock investigations, entomological investigations, and some work in extension, particularly in connection with the study of conditions that pertain to the marketing of the Porto Rican grapefruit and oranges. These fruits come to New York in pretty bad shape; sometimes 30 per cent of them are so decayed that the fruit has to be repacked. Of course, that is a very decided loss to the shippers because they not only have to pay the freight on the whole cargo, but they have to pay the cost of repacking the fruit. We have a man now who spends practically his entire time studying losses in shipping grapefruit and oranges. Last year the shipment of grapefruit and oranges from Porto Rico amounted to nearly $3,000,000.

Mr. ANDERSON. Are there different methods required in shipping grape fruit from Porto Rico than in shipping grape fruit from Florida?

Dr. EVANS. The conditions are different. In Florida they are put into refrigerator cars.

Mr. ANDERSON. They are not refrigerated, are they?

Dr. EVANS. A great many of them are, particularly in the warm part of the year.

Mr. ANDERSON. I mean from Porto Rico?

Dr. EVANS. Oh, no; not from Porto Rico. Until the last few months there was not a vessel going to Porto Rico that had any refrigerator storage facilities. There is one boat now plying between New York and Porto Rico, a boat put on by a comparatively new organization, that has refrigerator storage. But most of them simply put the fruit in the hold, leaving Porto Rico with a temperature around 85 and reach New York at most any temperature that happens to prevail, with very heavy losses, mostly in connection with rots. It has been found that that could be alleviated by paying attention to proper ventilation of the hold and proper supervision of the conditions under which the fruit is packed.

GUAM.

Mr. ANDERSON. Tell us something about Guam.

Dr. EVANS. In Guam we have had to retrench in our work on account of lack of appropriations. We have only one scientifically trained man left there. We have one assistant who has taken over some of the work that had previously been carried on in extension: two natives that have been given some special training, and one man in charge of the stock farm.

Mr. ANDERSON. What is the population of Guam?

Dr. EVANS. About 20,000.

Mr. ANDERSON. Are any of them engaged in agriculture?

Dr. EVANS. Prior to the Americans taking possession of Guam, agriculture was the only pursuit of the island. Without wishing to criticize any of our other departments, it is a fact that in 1908 pretty nearly everyone had left their farms and were working on the roads. And after a while that condition seemed to be intolerable, and the Navy Department asked us to help them along, and we established a station down there, and since 1908 we have been trying to improve the agriculture of Guam and get the people back on their farms. I think we have been very successful in introducing a large number of crops from various parts of the tropical world that were unknown in Guam before then.

We have now got them pretty well established. Our success has been very gratifying with the live stock. We have taken Ayrshire cattle to improve the local animals; we have taken Berkshire hogs to populate the island with grade Berkshires. We have taken the larger varieties of poultry, principally Rhode Island Reds, and we are not only getting the Rhode Island Red established as a pure strain of poultry in Guam but we have also developed a cross between the black-meat Guam fowl and the Rhode Island Red, thus producing a new variety of fowls that are hardy and good layers. It is much larger than the Guam fowl.

Dr. **True.** We get some of the best boys' club work right down there.

Dr. **Evans.** A beginning was made in extension work, but with the failure of our appropriation to be increased last year both our extension man and our agronomist resigned, and that left both of those places vacant. In order to carry on the work at all, it was necessary to cut down work in agronomy, formerly conducted on a field scale, reducing it to small-plat work. The horticultural and live-stock work have also been extensively curtailed. The extension work that was done, particularly the boys' club work and the girls' club work, has been turned over to a former yeoman, who is carrying it on as best he can, but he has not had the scientific training and the experience on the mainland with club work.

Before the extension agent left us he had about half the school children of Guam enrolled in boys' club and girls' club work. Not only that, but more than 82 per cent of them carried out the full program of their work and made written reports at the end of the year. Those children last year raised more than $27,000 worth of products. It is with them that we are particularly anxious to keep on working, because they are going to be the farmers of the next generation. It is pretty hard to get the older ones to take up anything new unless there is stimulated a sort of rivalry to see who can produce the biggest or the best. That seems to be the only way to get the older people to take new agricultural pursuits.

As a result of this club work there have been a number of fairs held throughout the island in which the prizes have nearly always been agricultural implements. For the first time in the history of Guam one district in the island reported last year that every inch of ground that was under cultivation was being cultivated with American implements. That work has been practically terminated because we can not support the Guam station on $15,000 and carry on the work as we thing it ought to be carried on.

VIRGIN ISLANDS.

Mr. **Anderson.** We will now take up the experiment station in the Virgin Islands.

Dr. **Evans.** The Virgin Islands experiment station was inherited from the Danish Government when the Virgin Islands were purchased. There was established in 1910 an experiment station on the island of St. Croix. We succeeded to that on January 1, 1919, and we have been trying to develop it along American lines since that time. During the last year it was excessively dry throughout the whole of the minor West Indies, and for that reason the results have not been as good as expected. There has been a large amount of work necessary to get the station in shape to carry on experimental work for the reason that it was an old abandoned sugar plantation that was turned over for use as an experiment station. The buildings are wholly inadequate for our needs and the fences are practically all gone. So we have been devoting most of our time to repairing the buildings and fences, getting ready for the work that we expect to take up very shortly.

A letter which I received this morning gave me a very brief account of the work that has been accomplished in the last few months in vegetable growing, a thing that was said to be impossible in the Virgin Islands. They have already found that a large variety of beans do very well there; also radishes, turnips, carrots, okra, rutabagas, onions, lettuce, cabbage, eggplant, tomatoes, peppers. They produce very well when properly planted. They have got to be planted at the end of the rainy season and not at the beginning. If you plant at the beginning of the rainy season you are almost surely doomed to failure, but if you plant at the end of the rainy season such crops can be handled successfully.

I visited the Virgin Islands two years ago next month, and at that time I was very much surprised to find practically no vegetables in the market of any kind whatever. A few vegetables and few fruits that were to be had were brought over from the British island of Tortola or from Porto Rico. There were practically none produced on either St. Croix or St. Thomas.

Mr. ANDERSON. What is the population of those islands?

Dr. EVANS. Approximately 40,000, I think, the census gave.

Dr. WASON. Do you grow potatoes there?

Dr. EVANS. Not very well. We have, however, a certain variety of sweet potato that was introduced that is doing very well. The people depend largely on the tropical yam, which is somewhat similar to our sweet potato, and also the cassava. Those are the only starchy vegetables that they produce in any quantity whatever.

Mr. MAGEE. What do the people do mostly in the Virgin Islands, agriculture or fishing?

Dr. EVANS. The island of St. Croix is devoted practically all to agriculture. On the island of St. Thomas the people formerly lived by working around the harbor of St. Thomas, but now that the Shipping Board has changed it from a coaling station to an oil station the old work of coaling vessels has practically ceased and the people are in a precarious condition for something to do.

FOR INVESTIGATING UTILIZATION OF AGRICULTURAL PRODUCTS FOR FOOD, CLOTHING, ETC.

Mr. ANDERSON. On page 192 there is an item to enable the Secretary of Agriculture to investigate the relative utility and economy of agricultural products for food, clothing, and other uses in the home.

Dr. TRUE. Mr. Langworthy will represent that item. That is the same appropriation we had last year.

Mr. LANGWORTHY. Mr. Chairman and gentlemen, the work next year would necessarily be along the same general lines and have much the same scope as this year, since the appropriation asked for is the same. You may be interested to know that during the present fiscal year about three-fourths of the appropriation is used for studies of food selection, food preparation, dietetics, care and repair of clothing and of household equipment, and similar problems; and one-fourth for work, including problems of food storage and household labor, which can be studied most profitably with the respiration calorimeter.

INVESTIGATING CAUSES OF DIFFICULTIES ATTENDING TRANSPORTATION OF GRAPEFRUIT, ETC.

Just now Dr. Evans alluded to the Porto Rican grapefruit situation, with respect to losses in transportation. One of the investigators from the Porto Rico Experiment Station came to Washington within the last year and asked if it would not be possible to study with the respiration calorimeter this problem of grapefruit transportation, with a view to learning the cause and finding a remedy for the very considerable losses. We told him we would be very glad to do what we could at once, and as a result coperated with the Porto Rico Experiment Station in an experiment in which we measured the heat, carbon dioxid, and water vapor produced by the grapefruit as a result of natural ripening processes at room temperature.

The fruit, one must recall, is not dead when it leaves the tree, but goes on ripening just as a harvested apple "ripens" or "mellows." It was found that the grapefruit gave off heat at the rate of two-hundredths of a calorie per kilogram of fruit, which is an appreciable amount of heat. In shipping from Porto Rico the fruit goes into the warm hold of a vessel. The holds are closed; there is little ventilation or circulation of air, and the heat which the fruit generates does not escape, and the air becomes very warm. It also becomes very moist from the water vapor the fruit gives off. The result is a condition very favorable to the growth of microorganisms and molds which cause decay. This explains how high spoilage of the grapefruit may occur under these conditions of shipment. In the experiment we put the fruit into the respiration calorimeter chamber at room temperature. The heat and moisture given off by the fruit was carried away and the fruit kept at an even temperature in fairly dry air. At the end of two weeks it was taken out and found to be in excellent condition. As I see it, this suggests a remedy for part of the grapefruit-shipment trouble. The hold of the vessel must be well ventilated and the air in it kept reasonably dry. This means that good ventilation in the hold is the first step. Mechanical refrigeration will give still better control of conditions.

Of course, no one would be foolish to say that the question is settled by one single experiment, but it is fair to say that the results are at least very promising, and that they point to a solution of the problem.

I have a paper here not yet published which reports the experiment with grapefruit and the results of similar experiments with apples, celery, and eggs. The department has published a report of earlier experiments with bananas and pineapples, in which we measured the heat, water vapor, and carbon dioxid output due to the normal ripening of the fruit. Lessening the intensity of such changes and hindering the growth of molds and organisms of decay is what cold storage means, expressed in laboratory terms. The cost of cold storage has an obvious relation to the amount of heat that is held by the product when it goes into storage and also in the case of fruit and vegetables to the amount of heat that is generated as the fruit or vegetables continue to ripen; for it is this which must be overcome by chilling. There are products which do not generate heat when stored—butter is one of them. It does, however, carry heat with it when it goes into the cold-storage chamber. It is apparent, therefore, that theoretically the storage of a ton of butter or lard or some other food which does not generate heat offers a different storage problem from a ton of fruit. The study of such problems is of great importance to agriculture, not alone to the housewife who buys the product for her table. Cold-storage engineers are aware of this and interested in such work. A proof of this is that the British Government not long ago began work similar to ours, but not on just the same scale. One might think that a respiration calorimeter would not have a very practical relation to everyday life, but when one realizes the usefulness of the study of such problems as this, it is apparent that it is a very important task for the laboratory worker. The Bureau of Plant Industry and the Bureau of Markets have cooperated in this work. The inquiries which we have received are an indication of the interest which is being taken in it. I believe that this is one of the most promising lines of work, because it leads into something large and very practical.

We have found that the respiration calorimeter is equally useful for studying the problem of artificial incubation of hen's eggs. As every one knows, warmth and ventilation are important factors in incubation. These and others can be controlled for experimental purposes when the respiration calorimeter is used. Work of this kind was well begun, but was interrupted by the war. We want to begin it again and to study the hatching of eggs artificially.

Mr. ANDERSON. Is not that being done now at the farm?

Mr. LANGWORTH. That is being done now at the department poultry farm, or rather is being prepared for. So far the work is concerned chiefly with design and equipment. Soon the special respiration calorimeter equipment needed will be ready and we hope that the experimental work can be resumed. We are cooperating with the Bureau of Animal Industry and working with its Poultry Division in designing and installing at the Beltsville farm the equipment needed for the experimental work.

We are continuing the respiration calorimeter studies of the energy expended by a housekeeper in carrying on housework. For instance, it is possible with such studies to determine the amount of work saved by the use of some special kind of household equipment or labor-saving device. Obviously we want among other things to save strength in case of work which is done oftenest and that which is hardest. We are finding out definitely about such matters in the experiments which are now going on and the results of which are being published.

INVESTIGATING WINTERING OF BEES.

I would like to mention briefly another piece of work in which respiration calorimeter apparatus and methods were used. This was a study undertaken at the request of and in cooperation with the Bureau of Entomology, to secure information which would help the bee keeper to winter his bees economically. The quieter the bees remain in the hive the less food they eat. The experiment had to do with the relation of the temperature of the hive to the bees' activity and the relation of the activity to the food which must be supplied to them. The results, obtained in the study, I think it is fair to say, were of decided value for this purpose. However, the value of the work is not limited to this. It has interest for the biologist and to the specialist who studies energy expenditure for work and similar problems.

The experiments also illustrate the varied uses to which respiration calorimeter methods can be put in the study of agricultural problems.

INVESTIGATIONS OF FOOD PREPARATION, DIETETICS, ETC.

To speak of other activities of the Office of Home Economics, the work on food preparation, food selection, and dietetics has been carried on very profitably, and I feel sure that much has been accomplished. Some of the experimental studies have been finished and conclusions drawn from them. Many new and equally promising problems await study. One of the problems which has been solved has to do with methods of home pastry making in such a way that without loss of quality a considerable saving of fat is possible. The results of this work are practically ready for publication. We have also completed a project which has to do with meal planning, of which I have spoken heretofore. As a result of this work it is possible to discuss food selection and meal planning clearly and with reasonable definiteness and in every-day terms which are readily understood.

Farmers' Bulletin 1228, A Week's Food for an Average Family, contains a reproduction of charts which were designed to make the matter clear. Simply put, the method of food selection is based on regarding all the foods we use as divided into five groups, in such a way that similar things are brought together, and then seeing to it that each of these five groups is well represented in the daily meals week in and week out. If this is done, it is practically certain that all the body needs will be met. The five groups are: I, Vegetables and fruits; II, Meat, milk, eggs, fish, and similar foods; III, Cereal grains and flour and other products made from them; IV, Sugars and other sweets; and, V, Fats, like butter, oil, cooking fat, and fat foods, like bacon and suet. Extended study of the problem has shown that housekeepers can and do understand this and find it a great help.

Another publication, Department of Agriculture Bulletin 975, Food Values: How Foods Meet Body Needs, describes and discusses a graphic method for calculating and computing food values, which is easily followed and very useful.

These examples show, I think, that definite progress has been made, and that we have here something very definite, which is not only reliable but easily understood, to give to the housekeeper who wishes to check up her food supply and choose food wisely, so that her family may be truly well fed. In carrying on these studies the needs of the extension worker have been constantly kept in mind, and, indeed, much of what has been accomplished is due to the help of such workers who have consulted with us and tried out the plan in the field.

Many examples could be given of work undertaken to provide answers to questions which housekeepers often ask. For instance, one of these is whether or not foods cook more quickly in aluminum dishes than in dishes made from other metals. Judging by our experiments, foods cook really more slowly in aluminum. In some cases this may be and in others is may not be an advantage, but, at any rate, it is well worth knowing, so that one can work intelligently in any given case. Methods of home drying of vegetables have been tested, and keeping quality, methods of preparation for the table, and other such matters carefully checked. It was found that such dehydrated vegetables are best when freshly dried and that they do not improve by keeping, but rather the reverse, different kinds of vegetables varying somewhat in this respect. The wise thing for the housekeeper to do, therefore, is to use her dried vegetables early in the winter season. Later she can use the vegetables which she has canned. It has also been found that the dried vegetables and dried fruits, if of good quality, do not need to be soaked before cooking them. Standardized recipes for preparing them for the table have been provided.

To cite another instance, experiments on food preparation have shown that fat absorption is greater in the case of foods fried in deep fat than in those which are sauted or “ pan fired.” The gluten of wheat flour lessens fat absorption in frying doughnuts and similar foods, and, contrary to the statement sometimes made, egg does not do this.

Mr. ANDERSON. Let me ask you, does a high proportion of gluten in wheat tend to increase or decrease the absorption?

Mr. LANGWORTHY. Judging by our experiments, an increase in the amount of gluten decreases the fat absorption.

Some of the work on meat cookery is of special interest, particularly that which has to do with the amount of fuel required. It is sometimes said that the tougher cuts of meat require more fuel to cook them than do the more expensive and tender cuts. The methods followed, of course, have something to do with this, but by using proper methods under comparable conditions, this opinion is not justified. Using the simmering burner on the gas stove—that is, the small flame—tough meat can be cooked with less gas than would be used for roasting a comparable cut of expensive meat.

Mr. ANDERSON. Would not that depend somewhat upon the quality of the meat?

Mr. LANGWORTHY. In our experiments we have tried to take such matters into account.

HOME-CANNING INVESTIGATIONS.

The interest in home canning is as great as ever and many of the technical experiments carried on in the Office of Home Economics have to do with this subject, particularly the causes of spoilage. It is clear that one can not work with certainty and prevent spoilage unless one knows the microorganisms which cause it and conditions which favor their growth and how to prevent this.

Much attention has been given to the use of canned goods in the home and similar matters. Cooperating with extension workers, Farmers' Bulletin Home Canning of Fruits and Vegetables has been prepared, which brings together material which has heretofore appeared in a number of bulletins. As the results of investigation accumulate it is believed that it will be possible to make more definite statements than is now the case.

A Farmers' Bulletin which has proved popular has to do with rice and its uses in the home. Although it was not possible to provide them, it was a satisfaction to receive from growers and others interested requests for very large numbers of copies of this bulletin—in one case at least 100,000 were requested.

Other illustrations of popular bulletins which have resulted from the experimental and other studies carried on are Farmers' Bulletins 1180, Housecleaning Made Easier, and 1219, Floors and Floor Coverings. Such publications are designed to help housekeepers choose their household equipment and furnishings wisely and to care for them in such a way that they may give long service, as well as satisfaction. In some cases it is possible to give practical directions for refinishing, mending, or otherwise repairing household equipment. For instance, the bulletin on floor coverings gives directions for mending holes in rugs and carpets and making other repairs which can be carried on in the home without undue labor and which would often mean a considerable saving, since the replacing of a damaged rug or carpet usually means a considerable sum.

It has been very interesting to find that manufacturers and dealers have been so much interested in this bulletin that they have requested large numbers of copies for their use. The reason given was that reliable information on such matters is greatly needed in order that the salesmen may answer correctly the questions put by customers, and in their opinion this bulletin supplied such information. The bulletin was, of course, prepared for the housekeeper, but it is a satisfaction to know that a very much larger and more technically informed audience than we had in mind considers it good. We took pains in preparing the bulletin to get information at first hand, and the willingness with which all whom we asked gave information is one of the gratifying things about the work.

It is possible to give directions for repairing other things besides carpets and rugs, and do it very successfully. For instance, a hole about half an inch in diameter was burned in this coat [shows it] and was mended in the Office of Home Economics. I think you will agree with me that it is difficult to detect the repair.

Mr. Wason. You certainly did a pretty good job.

Mr. Langworthy. One of my associates in the Office of Home Economics did the mending and there is no reason why any one else who knows the method should not be able to do as well, or better.

As a matter of fact, it is fair to say that nothing seems to interest housekeepers, extension workers, and others who visit the Office of Home Economics more than to find that such studies are being carried on. They are interested to learn that tears or holes in rugs and carpets can be repaired so satisfactorily and without too much work. The same is true of similar repairs to other household textiles and to garments. An individual example, interesting as it may be, does not seem to mean very much, but when a considerable amount of such information is brought together and standardized—and this is what we want to do—it is obvious that the housekeeper has been provided with information which will enable her to keep her possessions in good condition and to effect considerable savings. Work of this sort lends itself particularly well to extension teaching.

MODEL FARM KITCHEN.

This photograph [indicating] shows a model of a well-planned farm kitchen. It was designed and worked out in cooperation with specialists in the Department of Agriculture interested in exhibit material, and the model has been loaned for exhibit at agricultural fairs and otherwise and has proved very popular. As the photograph shows, the kitchen has on one side of it a screened-in-porch for a summer dining room, and on the other a winter dining room. The built-in china cupboard and other equipment opening into the winter dining room means many steps saved, as do the drop shelves of the window opening into the screened porch, and through which foods can be readily passed in for the table and dishes passed out, almost onto the sink where they are washed. All the equipment of the kitchen is so placed that the trips which must be made most often in doing housework are the shortest possible. This means a saving of steps and a saving of labor. The height of the sink and that of all other working surfaces is such that the housewife can stand erect at her work, and so avoid the fatigue that comes from stooping. Ample provision is made for ventilation and for light and for the comfort of the worker. It will be seen that this kitchen is designed as a workshop and not as the general gathering place which the old-fashioned kitchen so often was. However, if one has a large kitchen and wishes to keep it, it is possible, at no great expense, to rearrange and regroup the equipment in some particular part of it, and to otherwise change it so that one may profit by the principles which this kitchen model illustrates.

INVESTIGATIONS OF HOUSEHOLD MANAGEMENT AND LABOR.

We have also continued the studies of household management and labor. Recently this work has had particular reference to the standards of living in farm homes and has been carried out in close cooperation with the Office of Farm Management and Farm Economics.

In a way, the kind and number of publications which come from an enterprise are a measure of its accomplishment. In the case of the Office of Home Economics the output has been large. I have already referred to a number of farmer's bulletins and other recent publications which represent this work and there are others which might be mentioned. To sum up the matter briefly, we have prepared during the year 1921, six new farmer's bulletins, three professional papers, a considerable number of mimeographed articles, and a large number of articles for the Information Service of the Department. In addition 25 articles have, with the consent of the department, been published in technical and professional journals during the past two years, and as many more await publication. I have here a list of those so published. It is perhaps too long to read, but I wanted to present it here since it helps to give an idea of the kind and amount of research work which has been carried on and made public for the use of teachers, extension workers, and others who are interested in the study of home problems.

The Office of Home Economics has, as a primary object, the collection by experimental methods, by compilation, and otherwise, of information which is needed in the extension work of the States Relation Service. The consolidation of the two offices of extension work into the Office of Extension Work will not lessen, but will, we hope, strengthen the cooperation between that office and the Office of Home Economics. Therefore it is planned, while pursuing the general purpose of studying the use of agricultural products in the home for food, clothing, and other purposes, and the labor incident thereto, as heretofore, to make even greater effort to have this conform to the needs of the extension offices. We feel that the Office of Home Economics has an opportunity here which is very welcome and which we want to develop so far as our resources will permit.

There are other matters regarding the work which can be spoken of if you desire to have me discuss them. There are still some of the samples of the work here if you care for them.

Mr. WASON. We saw them this morning.

FOR GENERAL ADMINISTRATIVE EXPENSES.

Mr. ANDERSON. On page 193 is the item for general administrative expenses connected with the lines of work of the States Relations Service, including the offices of the director, the chief clerk, the officers in charge of publication, library, accounts, records, supplies, and property, and for miscellaneous expenses incident thereto. Dr. True, will you explain that item?

Dr. TRUE. That is the same item as last year. There is no increase in the estimate over the appropriation last year. There is no change in the general situation.

Mr. ANDERSON. I might as well ask you as somebody else. Apparently these general administrative expenses are just little pieces tacked onto something else which is used for the same purpose as some other appropriation. For instance, you have here one agricultural physicist, two scientific assistants, and one assistant, all paid under this appropriation. Now, why are those gentlemen carried under this item?

Dr. TRUE. Because under our organization they are connected with our central office.

Mr. ANDERSON. So are a lot of other people on your statutory roll.

Dr. TRUE. But these people are not in the same class as the ordinary statutory people.

Mr. ANDERSON. Why not?

Dr. TRUE. Probably from the character of their work. This man is an agricultural physicist. He is in charge of our publication work and he has with him a man who helps him with special reference to the visual instruction work, preparation of lantern slides, etc.

Mr. ANDERSON. I thought that was all taken over by another board.

Dr. TRUE. No. He prepares the material for our extension work and those things are concentrated under our organization in what is called the director's office.

Mr. ANDERSON. I have never been able to find out why we had to have a little administrative expense item at the end of every bureau where you carry three or four men who might just as well be carried somewhere else.

Dr. **True**. Perhaps it is a matter of custom as much as anything else.

Mr. **Anderson**. I could understand this if it was confined to the purchase of stationery or records and supplies and property, but what I can not understand is an item of this kind.

Mr. **Ball**. Before we had the 10 per cent provision, there was no item for emergency work. When we had the 10 per cent——

Mr. **Anderson** (interposing). I can understand this very well if it was on the basis of an emergency for emergency periods, but apparently it does not work out that way. There are additional men carried as an administrative item who are in the same position as people who are carried on the statutory roll.

Dr. **True**. On the statutory roll we carry the clerical and the subclerical people.

Mr. **Anderson**. You carried a lot of administrative people?

Dr. **True**. Well, except for myself, they are all in the clerical and subclerical classes. We may call them administrative assistants, but they are people of a clerical routine description.

Mr. **Anderson**. Then, it is a misnomer if these people are not administrative employees.

Dr. **True**. But they are not in the statutory class. That is why the expense is so small. This business deals with the general business of the States Relations Service.

Tuesday, February 14, 1922.

WEATHER BUREAU.

STATEMENT OF MR. CHARLES F. MARVIN, CHIEF OF THE WEATHER BUREAU.

ADDITIONAL EMPLOYEES—INCREASES IN SALARIES.

Mr. **Anderson**. We will take up this afternoon the office of the Weather Bureau, page 10, statutory salaries as submitted.

Mr. **Marvin**. Mr. Chairman, there are a number of changes in the statutory salary roll. I do not know just how far you want to discuss this in detail. Many of the changes have reference to meritorious increases in compensation of employees that have been on the statutory roll for a good many years. These were submitted in good faith in preparing the estimates, but it is my understanding that the committee is not considering increases in compensation, and I will not discuss the matter unless there are some points you care to hear about.

Mr. **Anderson**. That is the general policy. Let me ask you whether this involves any increase in your force?

Mr. **Marvin**. There is an item of two new places—two executive clerks, at $2,160; that is practically an increase in the force of two persons. We have need in the office for a higher grade of salaries than any carried in the statutory roll, and we put in these two additional clerks at $2,160 to provide for that.

These are men who have some administrative responsibilities in the administrative offices of the bureau, and constitute practically new places there. But I am frank to say to you that I think you see we can not get men with meteorological ability and information outside of the bureau. We are compelled to recruit for important and responsible assignments from the organization itself, and while these are two new places, persons to fill them would be probably selected from men available in the Weather Bureau who are best fitted for the purpose, with change in their responsibilities, etc., simply because we can not get the kind of men we need outside of our organization.

There are a number of other changes. There is one I would like to mention particularly that comes next, possibly, and that is change of title of a man who is to be designated assistant engineer. He is now carried as instrument maker. The Civil Service Commission has permitted us to appoint an instrument maker (assistant engineer) but we would like the title of that place changed to make it agree with his duties.

Mr. ANDERSON. What is the salary he is getting now?

Mr. MARVIN. He is getting $1,260 in a former instrument maker place that we could not fill with an instrument maker, and we got the consent of the Civil Service Commission to put an assistant engineer in there.

Mr. ANDERSON. This note says 30 new places with salaries aggregating $42,440 have been added. That is really a substitution of 30 places for 30 other places?

Mr. MARVIN. For 30 other places, you see. With the two additional men at $2,160 mentioned above, there is an increase in the number.

Before we leave that, I would like to say, Mr. Chairman, that the positions of printers in the bureau is a matter that has been giving us a great deal of trouble for a number of years. We are not able at the present time to get journeymen printers and compositors, as they are called, at the salaries of $1,080, $1,200, and $1,300 that are in the statutory roll, and if there is any possibility of making the changes that we have recommended in these positions it will enable us to get a class of men that meet our requirements, which would mean a great deal to the bureau. We have had to put in printer's helpers. We can not get the men that the title calls for, and the Civil Service Commission has authorized us to appoint printer's helpers at these salaries, but they are men with a very limited experience in printing who do some of the work that we require. We can not get the efficient services that we should have.

Mr. ANDERSON. These printers are employed here in Washington; they are not people employed in the field, I guess.

Mr. MARVIN. There are 35 places in all. There are 7 of them in Washington and 28 in the field. The total change called for is an increase of $4,540 for these changes of printers.

Mr. ANDERSON. What does that total change amount to?

Mr. MARVIN. The change that is covered in here amounts to $4,540, and there are 35 persons involved in it. Seven of those are in Washington and 28 are in the field, one at each of the 28 cities where they are on duty. The increases are very small.

Mr. **Wason.** What do these printers do?

Mr. **Marvin.** The printers here in Washington are in the little printing office we have there. They set type; they are compositors; and in the field the men are both compositors and pressmen, setting up a small amount of type to print the weather map and bulletins that we issue at the stations. The work is done in the mornings of each day; it is rush job, hurried work, and although it is limited in amount it requires a capable man to do the work.

In addition to that once a month we print at some of these field stations the reports of many hundreds of cooperative observers, giving the detail weather conditions, temperature, and precipitation. These cooperative observers make observations once a day, for which they receive no compensation, and send them into the section center. Those reports are assembled and give us the data on which the climatic conditions of the country are established.

Mr. **Anderson.** How do these salaries compare with the salaries paid down at the Government Printing Office?

Mr. **Marvin.** They are much lower. The salaries we are requesting here, as it affects the men on duty in Washington, still leaves their pay below the corresponding salaries of men in the Government Printing Office. The leading compositor is listed here to get $1,600, according to this change. He now receives $1,440.

We want to give 17 of the printers, 6 in Washington and 11 in the field, $1,500; and we want to give 17 others in the field $1,300.

Mr. **Anderson.** You can furnish us with a statement showing just what the promotions are that will be made under this list as it stands as you propose it?

Mr. **Marvin.** Yes, sir. Would that be for the entire list, or just the list I was speaking of?

Mr. **Anderson.** I think you might as well furnish us with the whole list. You can tabulate it separately so that we can get the printing force separately out of it.

Mr. **Marvin.** We have that here, practically.

Mr. **Anderson.** All right.

Mr. **Marvin.** And I will prepare a table for the entire force. There are some changes of title that I hope you will note and allow; one or two of them are with promotions and some others not. The changes of title are, of course, desired simply to make the title of the place consistent with the work now performed.

Table showing new places and changes in estimates of statutory salaries where increases and changes of title are involved.

Position.	Number.	1922	1923	Total increase.	Remarks.
NEW PLACES.					
Executive clerks	2	....	$2,160	$4,320	
INCREASES AND CHANGES.					
Administrative:					
Assistant chief	1	$3,250	3,600	350	
Chief clerk	1	2,500	3,000	500	
Printing force:					
Lithographers	3	1,200	1,400	600	In Washington.
Printers or compositors [1]	1	1,440	1,600	160	Do.
Do	6	1,350	1,500	900	Do.
Do	1	1,440	1,500	60	On field duty.
Do	10	1,300	1,500	2,000	Do.
Do	1	1,200	1,300	100	Do.
Do	6	1,080	1,300	1,320	Do.
Folders and feeders [2]	4	720	840	480	Title changed to press feeders, with promotion.
Mechanical force:					
Skilled mechanic	1	1,300	1,600	300	Very urgent case.
Skilled mechanics	2	1,200	1,400	400	Do.
Do	3	1,000	1,200	600	Do.
Engineer	1	1,300	1,600	300	
Telegraph line repairman	1	1,000	1,200	200	
Electrician	1	1,200	1,400	200	
Captain of the watch	1	1,000	1,200	200	Title changed to foreman of messengers and laborers, with promotion.
Gardener	1	1,000	1,200	200	

[1] There are a total of 35 printers or compositors, 7 in Washington, 28 in field. One will receive $1,600, 17 will receive $1,500, and 17, $1,300; 10 will experience no change in salary, and 25 will be increased from $60 to $220 each.

[2] The work of these men is feeding presses and automatic folders.

Apparent increase	$13,190
Actual increase	11,190

Mr. ANDERSON. There is no change in your language on pages 12 and 13?

Mr. MARVIN. No, sir; there have been no changes made in that at all, and that brings us to the expenses in the city of Washington.

FOR COLLECTING AND DISSEMINATING METEOROLOGICAL, CLIMATOLOGICAL, MARINE INFORMATION, ETC.

This item of expenses in Washington is in addition to the statutory roll which we have just passed and most of which is in Washington, although there are quite a number of men in the field also, the printers that I mentioned, for example. This item covers the activities of the bureau in the city of Wadhington. The amount of that appropriation has been stationary, as you see by the table in the estimates, for several years. There was a slight reduction in 1922, due to a transfer of a man from the miscellaneous to the statutory roll; the appropriation has been stationary, and we are asking here for an increase of $15,760, divided up among several items.

HURRICANE WARNING SERVICE.

Item (a) has reference to improvement of the hurricane-warning service in the Gulf of Mexico and along the south Atlantic coast and West Indies. I do not know that I need to say very much about the work of the bureau. I think you realize that our whole program of work is really one of a daily service to the public in collecting daily observations of weather conditions as they actually are, telegraphically, and disseminating advices, information, and warnings of every possible condition that would benefit the public in the saving of life and property. This program of service has taxed our appropriations for previous years, and as the prices of things have gone up in more recent years, we simply had to make the service fit the appropriation, and we have had to cut off.

Mr ANDERSON. This item I take it would be dependent upon an increase for the out-of-Washington work?

Mr. MARVIN. Yes. This is an in-Washington part of that Mr. Chairman. The work is mostly in the field, and the bigger part of the estimates and increase is in the field. But we need to increase the strength of the work here in the central office to keep pace with that. The service since the war with our aviation forecasts and the new demands that are urged upon us for better and more service necessarily make a greater load on the central office. The forecasting part of this hurricane-warning service is carried entirely in the central office. The increase requested contemplates the addition of one man at $2,160, and some incidental increases in the way of equipment and materials, amounting in all to $2,550 for the Washington part of it.

I will not need to say much more about that now.

GENERAL FORECAST AND WARNING SERVICE.

Mr. ANDERSON. We will go into that general hurricane proposition when we get over to the field?

Mr. MARVIN. Yes. This item (b) is of a somewhat similar character to the hurricane work—that is, it has reference to the general forecasting and warning service in connection with the preparation of charts. Let me say that we have some 200 stations distributed all over the country, from which we receive telegraphic reports twice a day. These reports come into Washington over a system of telegraphic circuits which commercial companies operate for our purposes. In about an hour's time we have received at the central office these 200 reports. They are received in cipher code. We have a man to translate the message as it comes in, and as he translates and calls off the different conditions that are reported men at charts at a large desk enter the data on these charts. It requires men who know their work, and the work has to be done very accurately and promptly. The map men must understand the symbols and everything that we use for depicting the existing weather conditions on these charts.

We have lost several good men from that force in the past few years by transfers and otherwise, and this is a proposition for adding some good men for the compilation of our charts.

The item I have here covers three men only: One at $2,160, one at $1,940, and one at $1,620. The increase is for additional technical men. The work has grown a good deal in past years, and as our service to the public becomes more appreciated they are more eager to get more service. We have had, I can fairly say, only compliments, on the whole, for the work of the Weather Bureau for the past several years, and the confidence of the people in the service makes them come to us for more work and more detailed and specific service. The forecast division, which is where this increase will be applied, works at high pressure in the morning hours, and the evening too, because this work is performed twice a day. The men come on in the morning and work until about noon, and then come on at 8 p. m. and work until about 10.30, and we must have the best kind of men we can get for that work. We need this additional sum for strengthening and building up this work and to make it meet the situation resulting from the simple growth of the Nation.

DEVELOPING MARINE METEOROLOGICAL WORK.

Mr. ANDERSON. We will now take up item (c), increase of $2,830 for restoring and further developing the marine meteorological work.

Mr. MARVIN. You realize, I am sure, that meteorology does not stop at the barriers of a continent. We have for many years been receiving reports from vessels at sea. These reports are made by the navigators in the course of their trips, and faithfully entered each day on forms which we provide. When they arrive in ports these reports are sent to the bureau, and we have all nationalities contributing in the furnishing of these reports. They are received at the office, and we chart them on maps. The most of the reports are in the Northern Hemisphere. Such maps give us one of the finest pictures we have of the conditions of the atmosphere over the Northern Hemisphere of the globe, and it is upon that larger picture of the conditions of the atmosphere—maps succeeding each other day after day—that we have the best basis for perfecting and extending the forecasting work.

These maps of the Northern Hemisphere give us for study purposes a better knowledge of what is happening in the atmosphere to cause the changes we see from day to day and follow in our maps of the continental area. The latter show telegraphic reports day by day, while the marine maps which are built up weeks later are required by the bureau to supply data for the pilot charts and in admiralty cases.

Before the war we were receiving telegraphic reports from foreign countries from which we made a map of the Northern Hemisphere, but we have not been able to resume that part of the work yet.

The Shipping Board has come out splendidly in cooperation with us in getting reports from their vessels, not only mail but also some by wireless. This increase item (c) is for additional force to use in studying, charting, and tabulating the marine data. With the restoration of merchant shipping we are getting an increasing number of reports, and this item with a slight addition in the field, is for rehabilitating the marine work. I will show you later that we want to put one man in the field at the port of New York to aid in collecting these observations; that is, he arranges with the captains to furnish reports to us. It is a proposition of enlisting the cooperation of these people. Nothing is paid for the observations, but we give them a calendar once a year and furnish them with certain reports and bulletins.

SUPPLIES, INSTRUMENTS, FUEL, AND TELEGRAPH SERVICE.

Mr. **Anderson.** The next is item (d) $4,660 for supplies, instruments, fuel, and telegraph services.

Mr. **Marvin.** That is simply, as stated, to meet the increased cost of supplies, instruments, and equipment, and is made up of $750 for instruments; an increase for fuel costs $1,010—that is, in Washington——

Mr. **Anderson** (interposing). Why should you have any increase in fuel costs this year? You ought to have a decrease, if anything, should you not?

Mr. **Marvin.** I have a statement here in regard to fuel cost. The cost of coal in 1916 averaged $5.68 a ton, while for the last fiscal year the price averages $9 per ton.

Mr. **Anderson.** But it will be lower than that next year.

Mr. **Marvin.** We consume about 450 tons a year, making an increase of over $1,400 in the cost of the fuel. The cost the first six months this year was $8 a ton. The amount asked for was to meet only the urgent needs. The balance of the sum there, $2,900, is for general supplies, making up the total of $4,660.

MAINTENANCE OF PRINTING OFFICE, WASHINGTON, D. C.

Mr. **Anderson.** Next is page 15, maintenance of a printing office in the city of Washington, an increase of $1,550.

Mr. **Marvin.** That is our little printing office where we produce the weather maps and bulletins that must be issued immediately to have any value. The appropriation has been very nearly stationary, as you see by the tabulation, and we are asking for an increase of $1,550. It is simply to meet the increased costs all around that we are called upon to pay for supplies as compared to previous years, and to keep our service up to what it should be.

Mr. **Anderson.** The Public Printer says that the cost of printing has been reduced about 15 per cent, cost of paper something like 40 per cent.

Mr. **Marvin.** We need funds here, Mr. Chairman, to meet these increased costs that we have to pay in order to perform the same service we have been performing, and we have no margin on which any kind of service can be increased as the growth of the service demands. We are continually confronted with needs for new and increased circulation of publications that come in this category, and the small amount there is needed to keep the service up to the standard at which it should be maintained.

The program of the service, as a whole, is highly economic to the country. It is a program of service, and the economic returns are such as to fully justify all the expenditures that are put upon it. It all goes into the general program of collection of meteorological observations and reports for the benefit of commerce, agriculture, and navigation; and it seems to me the benefits are such as to justify these items of expenditure which have been conscientiously arrived at, and we feel are very modestly presented in amount. They have been considerably curtailed from our original estimates, both by the department in finally consenting to the estimates and by the Budget Officer. Our original estimates were for larger sums than these, which we think are really needed to make the service what it should be. These amounts are what was left after the estimates passed the department and the Director of the Budget.

Mr. ANDERSON. This bureau has not fared as well as some of the others?

Mr. MARVIN. We have had a pretty nearly stationary status for some time.

Mr. WASON. Do you do all your printing with your own plant?

Mr. MARVIN. No, sir. There is an item, not to exceed $47,000, for printing at the Government Printing Office the Monthly Weather Review and some publications that are not required to be printed immediately to be of value, and those are printed by the Government Printing Office, and that amount is out of a separate appropriation for the printing of the Department of Agriculture.

Mr. WASON. But what you use these printers for is your daily report?

Mr. MARVIN. Yes, sir; the daily reports that are issued immediately. The observations are made at 8 o'clock in the morning, for example; the telegrams are received at Washington by 9.30 o'clock unless there is bad weather and telegraphic delays. Those are entered on maps, and the map is coming off the press at about 10.30. That is here in Washington. But the same thing is happening at field stations in the larger cities throughout the country.

The value of that publication depends upon its immediate issue. If we had to have that work done at the Government Printing Office, it would be impossible to get it out without such a long delay that the map would have no value.

Mr. WASON. Those maps are given away?

SALE OF PUBLICATIONS.

Mr. MARVIN. Some of them are given away, but we sell a great many of our publications. The maps are distributed around the city here, and there is a subscription list, and a number of people buy them.

There are also exchanges of the maps with foreign countries.

Mr. WASON. What are your receipts of the last fiscal year?

Mr. MARVIN. I am not sure.

Mr. WASON. You can put that in?

Mr. MARVIN. We can put that in. The receipts for the sale of the maps is not very great. We sell a number of other publications, and the receipts, on the whole, are quite worth while, considering that many of the branches of the Government do not sell their publications at all, but all are given away.

Mr. WASON. Do you sell any other products of these printers that we are talking of except maps?

Mr. MARVIN. Yes, sir. Prior to the immediate present the Weather Bureau printed a climate and crop bulletin during the summer months. One company, I recall, subscribed, I think, for 35 copies. That was printed in the Weather Bureau office, but since the 1st of January a different arrangement has been made by the department by which a combined bulletin, entitled "Weather, Crops, and Markets," is issued. The combined bulletin is printed at the Government Printing Office. I do not know just what the Superintendent of Documents does about mailing copies to the subscribers to the former bulletin, but I imagine they get the new bulletin in place of the old one.

Receipts for publications issued for and by the Weather Bureau during the 12 months ended December 31, 1921.

Publications printed by the Weather Bureau:	
National Weather and Crop Bulletin	$124.44
Washington maps	299.35
Station maps	269.58
Climatological data	167.25
Highway Weather Bulletins	4.00
Total	864.62
Publications printed at Government Printing Office:	
Monthly Weather Review (estimated)	525.00
Blank maps, most of which are printed at the Government Printing Office	239.50
Miscellaneous publications, including bulletins, cloud charts, blank maps, etc	(1)
Total	764.50
Grand total	1,629.12

NECESSARY EXPENSES OUTSIDE CITY OF WASHINGTON.

Mr. ANDERSON. We will now take up the next item, on page 16 which is your large item for expenses outside of the city of Washington

HURRICANE AND STORM WARNING SERVICE.

Mr. MARVIN. That is the major item for the outside of Washington expenses, and that brings up again the question of the hurricane-warning service. I would just like to give you a brief picture of this hurricane service; for instance, we had a big hurricane that passed up the Gulf of Mexico in October, on the 24th of that month, and which did a great deal of damage in Florida. This [exhibiting chart to the committee] is the picture of the track of the hurricane, as you see, coming up and going around in that direction [indicating]. We receive reports from the stations that are shown in the area throughout the islands of the West Indies and in southern waters. You will notice that the continental areas are shown in blue and the water areas in white. This storm came up through the Yucatan Channel and passed across the Florida Peninsula. We received these reports telegraphically from the stations there that are shown on the map in white and black; and we also received numerous reports from ships at sea, indicated in red. In this particular case there were a considerable number of ship reports, but it does not always happen that way.

When we gave the earlier announcement that the hurricane, then in the lower part of the Gulf of Mexico, was passing up in this direction [indicating], the vessels that received this report by wireless sent out by the Navy Department for us immediately proceeded to shun the danger zone of this great disturbance. The most dangerous zone is the right-hand semicircle of the hurricane, and you notice that all these vessels are on the left-hand side [indicating] and none on that side, except over here on the Atlantic side. That of itself is the dis-

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[1] It is impossible to secure information from the Superintendent of Documents as to how much revenue has been taken in for Weather Bureau publications, because their record is kept by departments as a whole, not by bureaus.

tinguishing effect and evidence of the benefits that result from these warnings. Vessels when notified of conditions in that region would be likely to be anywhere with reference to the storm center, and some at least would have suffered very serious disaster and injury without the warning.

The increase that we are asking for here is for the betterment of this service by giving us additional information through more vessel reports and more land reports. One of the greatest difficulties we have is to identify and locate one of these hurricanes when it is in the Gulf region over great expanses of water. The land observations show only indirectly the presence of the hurricane, you may say, just the merest indications that there may be a hurricane down there. It requires a forecaster of the greatest skill, discernment, and experience to recognize these symptoms, I may say, of the hurricane.

If we can supplement the land station reports with a few reports from vessels in closer proximity to the hurricane it gives us very valuable information in locating its position and forecasting its subsequent path.

The increase here, aggregating $22,860, contemplates a number of additional stations along the Gulf and South Atlantic coast region; no new stations are to be added in the Caribbean region. We want one at Jupiter, Long Key or some point near there, one at Cedar Keys, one at Fort Morgan, and a few others.

Those stations that we are asking for will cost $25 a month for services. The man employed will make reports to us from instruments which we furnish. He receives from us only a relatively small amount of compensation. That, however, gives us the telegraphic information from those exposed points on the coast that is of great value. The total number of stations we are asking for is 10. Ten special meteorological observers at $25 per month for six months, and additional vessel reports at 50 cents an observation. The total estimated for that is $3,400.

There are two points on that coast at which we want to convert a special meteorological station into a station at which we have a regular paid man. Those two points are Burrwood and Apalachicola; that means two additional men.

Mr. Lee. Is that on the west coast of Florida?

Mr. Marvin. Yes, Apalachicola is. Burrwood is in Louisiana, at the mouth of the Mississippi River. We have had a special meteorological station there for a long time, but the importance of that station—it is a very prominent point, reaching out into the Gulf—is very great, and we want to put a trained meteorologist there at $1,620.

Then, this project contemplates the addition——

Mr. Anderson [interposing]. Let me ask you in reference to that chart showing the force of that October hurricane. Were you able to forecast the force of that hurricane in advance?

Mr. Marvin. Yes, sir. We gave the warnings for that hurricane with remarkable accuracy, and you will remember it approached Tampa and crossed Florida just above Tampa. The people in Florida were warned splendidly in regard to the approach of that hurricane. Of course, warnings do not prevent hurricanes from coming, but they enable the people to take protective measures and move people and stocks, etc., away from high tides and effects of that kind.

The strong winds and the torrential rains that accompany these storms have to be looked out for, and the forecast work in the hurricane was done with great accuracy and success, but, as I say, every success that we accomplish in performing this work makes more exacting the demands upon us, and before this season came on we were appealed to by the people of Galveston, especially, for the betterment of the service in that section. Galveston, I think you know, is so situated with respect to the gulf hurricanes that it is a vital thing to them. When we send out warnings of hurricanes the people are more or less terrified and alarmed, and it is most essential that we give them the most comforting advices we can. We must send out these warnings as far in advance as possible, but we are careful to not unnecessarily alarm the different sections. We can not always tell just where a hurricane is going to go, but as the days progress we get a closer and closer indication as to its probable path. The advices that we give to the various communities and localities where danger is not evident allay their fears; and, on the other hand, where danger threatens, our warnings enable them to take precautionary measures by removing stocks, etc., and, in the case of Galveston, by getting the people out of the lowlands and removing stores from the lower floors when there is liable to be high tides, which would inundate portions of the area.

Mr. LEE. In this particular case, how long were the Tampa people advised?

Mr. MARVIN. I can not say now, but certainly 24 hours in advance of the immediate occurrence. They knew a storm was coming that way days beforehand.

Mr. ANDERSON. How long was this hurricane in traveling this entire course?

Mr. MARVIN. This chart will show you that. It was first sighted at 8 p. m. of October 21.

Mr. LEE. Down about South America, or where?

Mr. MARVIN. That was down below latitude 15° in the southwestern part of the Caribbean Sea. It took just two days to go from the point where we first saw it through the Yucatan Channel to a point just west of Cuba.

On the evening of October 24, the last date shown on this chart—that is two and a half days after it was first sighted—the center was just west of Sand Key (Key West). This particular map does not show when that storm crossed the Florida Peninsula, but it was, judging from these others, at least 24 hours after that. Twenty-four hours later the storm was a little southwest of Tampa, approaching the Florida coast. On the evening of the 25th it was central over the Florida Peninsula, and by morning of the 26th had passed into the ocean a little southeast of Jacksonville. They had ample warning beforehand, and not only did the people along the Florida coast know that the storm was headed their way, but the people to the westward knew that the danger to their immediate zone had passed.

Mr. ANDERSON. Apparently that hurricane changed its course from northwest to almost straight east?

Mr. MARVIN. Yes, sir.

Mr. ANDERSON. Is that the usual procedure?

Mr. MARVIN. That is almost characteristic; it is an exception when they do not "recurve," as it is. These hurricanes frequently start way out here [indicating] in the ocean, east of the Windward Islands, and they come all the way across the Caribbean Sea. Some have been known to have come across the Lesser Antilles, and follow out such a course [indicating] and go off about oortheast. In some cases they recurve over here. [Indicating the Texas coast.]

Take the hurricane that did a great deal of damage at Galveston in 1915. That hurricane came from way out here [indicating], passed through the Yucatan Channel, recurved after it passed inland south of Galveston. It then advanced northward through the interior of the United States and passed out through the St. Lawrence Valley. The entire history of that storm covered a period of 21 days.

The estimate here is for some increases that will enable the bureau to better organize this work. I started to say that before the opening of the hurricane season last year, the Chamber of Commerce at Galveston wrote Representative Briggs, who transmitted the communication to the Secretary, urging the betterment of the service at Galveston, especially, but it had reference to the whole coast. Here [exhibiting papers to the committee] is quite a bit of correspondence in connection with this matter in which the Secretary stated that he would endeavor to make such representations in the estimates as would provide for the betterment of this service. I would just like to read here a reply of Mr. Briggs to the Secretary's letter. This is dated May 30, 1921. [Reading:]

> I desire to assure you that the citizenship of Galveston are especially appreciative of your interest in this matter and will only be too glad to give you and the Weather Bureau all possible cooperation to the end that the weather service may be improved to the highest point of efficiency. I shall also personally be glad to aid you in this matter upon the floor of Congress and before the Appropriations Committee in securing adequate appropriations to meet the needs of the service.
>
> The exhaustive discussion by Hon. C. F. Marvin in his consideration of the suggestions presented by Mr. Sealy has been read with the greatest interest, and manifests a most gratifying concern over the difficulties now encountered and a most praiseworthy desire and endeavor to improve the service as soon and as far as can possible be done.

I might add that Mr. Sealy is the Secretary of the Chamber of Commerce at Galveston.

Mr. Anderson. Are these hurricanes of frequent occurrence?

Mr. Marvin. Four or five of them occur a year, on the average. We do not know when they are going to come or just why they come; they are not of great frequency, but scarcely a year goes by without one or two and sometimes there are four or five.

Mr. Lee. What time of the year do they usually come?

Mr. Marvin. The season starts in June. In 1921 the season opened in June, and, I think we had on the 21st of June quite a severe hurricane which came up the west coast of the Gulf. Fortunately it did not prove very disastrous because the warnings were timely and it did not pass over any large city. That was an early hurricane, before the usual season. The season begins sometimes as early as June and runs through to November; when we curtail the observations considerably.

Mr. Lee. September is a pretty bad month, is it not?

Mr. Marvin. Yes; all those warm months of the summer—July, August, and September.

When we send out warnings you would be surprised to see what happens in the Weather Bureau offices on the Gulf coast. They are literally besieged by the people, who go to the offices where they crowd the hallways and rooms to get detailed information. That condition grows worse as the days go by and the menace becomes greater in the localities that are threatened and they practically camp at the Weather Bureau station. Our men stay on duty all night frequently, and part of these increases are asked to enable us to assign additional men to some of these southern stations. At some places where we have one man we want to put two men or more.

Mr. ANDERSON. Are those $25-a-month men that you have here men with any training at all in this work?

Mr. MARVIN. They are not what may be called meteorologists, but they are men who know how to make an observation and file a report, they can be instructed to do that. They report present conditions; that is all they do. We make the deductions and inferences from their local reports in conjunction with the other reports we get. It is not a local proposition; it depends on these maps of conditions over large areas to show where a storm is at any time and where it was yesterday and where it is going to-morrow.

The program is for additional men, additional telegraphic expense, and additional stations, aggregating in all $22,860 for our very conservative estimate of what we ought to do in the southern regions, and the $2,550 additional item in Washington.

I would like to say that in Washington it is a question of a man here to take charge of the assembling of these reports the dissemination of the information, and the getting out of this information at the earliest possible moment. People are impatient to know immediately after the hour of an observation, what the conditions show. We call for special observations through the day. They are impatient for information, and we must get the reports charted, and the warnings into the threatened districts with the least possible delay.

ADDITIONAL EMPLOYEES.

Mr. ANDERSON. Can you give us the statement showing just how you divide that $22,860 up? You have 10 observers at $25 a month; that is $3,000.

Mr. MARVIN. First, Mr. Chairman, there are three additional men for properly manning stations where the force is small. Those three stations are Corpus Christi, Port Arthur, and Brownsville; we want to put three men in at those three stations. We want $3,240 for that purpose.

We want two additional full reporting stations at Apalachicola and Burrwood, two meteorologists will be required at $1,620 each, or $3,240; two assistant observers at $1,080, or $2,160, making a total of $5,400; instruments and equipment, cost of installation, etc., $4,000, a total of $9,400 for those; ten or more supplemental stations, $1,500 for salaries; and $2,270 for instruments for those additional stations; $1,900 for vessel reports, at 50 cents each, and $4,550 for telegraphing to the coastal cities more complete and detailed information regarding the progress of the tropical disturbances, and to cover wireless and telegraph tolls from vessels.

Those, I believe, are all the items that make up that $22,860, but I will correct the statement to make that complete in the hearings, if necessary.

RESTORATION AND DEVELOPMENT OF MARINE WORK.

Mr. **Anderson**. Under subitem (b), $1,440, restoration and development of marine work.

Mr. **Marvin**. That is to enable us to put an additional man at one of the great marine ports. The vessel reports that come in by wireless and mail, both from the Gulf and coastal regions and the Atlantic, enable us to get advices concerning conditions along the great ocean lanes of passenger traffic. We are asking here in connection with the development of the marine work for a man whose business it is to interview the ship's captains and masters to keep up this marine work, check up their barometers on arrival in port, and perform other marine meteorological work to sustain their interest and cooperation, which we need. It requres personal contact with the people to get the results we desire, and this is for one additional employee to be used in that capacity.

SNOW MEASUREMENTS.

Mr. **Anderson**. The next item, $1,000 for increased demands for snow measurements in the mountains of the West.

Mr. **Marvin**. That is more or less a service in the High Sierras of California and western mountain regions, where much of the water supply of the State and the great municipalities depends on the quantity of snow in the mountains. The Weather Bureau for many years has been measuring the snow in the high mountain regions by cooperative arrangements in the national forests, with any residents in those regions who measure snow with scales that we provide, and report to us the depth of snow. The water interests of California, especially, are insistent on more detailed and fuller reports of snow conditions in the eastern part of the State, and this item is to enable us to do more of the work in that way.

One of the forms of measurement that we make in certain regions is to take and weigh sections of the snow on the ground in the spring season of the year, practically after the snowfall season is past. We drive a tube of special construction down through the deep layers of snow to determine the water content of the snow in the watershed. Quite a number of samples are measured. This requires three or four days' journey into a watershed that is supplying some irrigation project or some reservoir to make these measurements, and from that we get the quantity of water available there. This item is for that purpose.

RADIO AND TELEPHONE CALLS.

Mr. **Anderson**. The next item is $1,700, to meet increases in radio and telephone tolls.

Mr. **Marvin**. That is a charge for increases on the rates that we are encountering with the changes in our contracts. You see, several of the radio companies that handle our work have indicated that there will probably be increased rates during the fiscal year 1923. The Independent Wireless Telegraph Co. has doubled its rates for the current year. All of the companies have refused to bind themselves regarding rates for 1923, and there is every indication that rates will be generally increased. The use of the telephone in distributing weather forecasts and warnings and costs of the service have gradually increased, although there has been no increase in the fund for those purposes, and this amount is needed to meet the increased demand placed on the service.

It is for telegraphic tolls resulting to some extent from increased service, but also to meet increased charges in order to maintain the same service. These rates have been changed a good deal during the past three or four years. We have previously brought up no item to cover the changes. Where we have not been able to meet the increases, we have had to shut off the service.

INCREASED COST OF SUPPLIES, INSTRUMENTS, RENTS, AND FOR REPAIRS TO BUILDINGS.

Mr. ANDERSON. You next have an item of $19,500 to meet the increased cost of supplies, instruments, and rents, and for repairs to buildings and cables.

Mr. MARVIN. That is in part for the purpose of meeting the increased costs of rents.

Mr. LEE. Does the Government own your office buildings?

Mr. MARVIN. In 48 places.

Mr. ANDERSON. Is that building rents or cable rents?

Mr. MARVIN. It is for rents of offices in the main cities of the country. I have a map here which shows the distribution of the stations in which we have rented quarters. The red circles on that map represent the places where we have weather bureau buildings. The others, indicated in blue, are places where we are compelled to rent quarters in private buildings.

The program of renting is like this: We make a lease for one year, with renewal option for a period of five years at the same rate of rental. These five-year leases terminate after that interval of time, and we are compelled to make new leases. For two or three years past, when the new lease comes up, we have been confronted with higher rentals right along. We have met those demands heretofore by the best method we could.

A year ago we made a drastic survey of the rental situation of the bureau. We cut down spaces in offices throughout the country wherever we could, and held the rental charge down practically to what it had been before by curtailments. We have practically come to the limit of what is possible there, and this year we are confronted with a difficult situation which can be met only by increased funds.

The amount for rent that is included to make up the item of $19,500 is $4,000. Quarters are rented in 97 office buildings throughout the country at an annual cost for this fiscal year of $96,570, 16 leases amounting to $19,984 will expire June 30, 1922, and from information available, together with the consideration of rate increases last year, it is estimated that more than $8,000 for rents will be required during the fiscal year 1923. No quarters are rented where space in Government buildings is available.

Mr. ANDERSON. Does that mean, $8,000 additional?

Mr. MARVIN. That is $8,000 additional; yes, sir.

However we are asking here for only $4,000 out of this $19,500, to go into increased rents. We do not know just how we are going to come out with that estimated $8,000 increase that we contemplate will be asked for the 16 leases that will expire of necessity, but we have limited our request here for increase for rents to $4,000. Those new leases must be made up this year. There are 97 rented quarters as a whole throughout the country, and about 66 offices in Government buildings, and 48 in observatory buildings of the Weather Bureau.

Another item of that $19,500 is for the repair work on these 48 observatory buildings. We have been holding off on repair work on the Weather Bureau buildings wherever we could possibly avoid expenditure for two or three years past, on account of the condition of our appropriations, and the great cost of work. While we estimate here that an average expenditure of $200 on each building, $9,400 in all, is all too small an amount to place them in good condition. We are only asking for $5,000 for this purpose.

The buildings at Mount Weather will have to be repainted and some minor repair work done.

Mr. ANDERSON. You have not succeeded in selling that yet?

Mr. MARVIN. The Agricultural Committee has the matter in hand, and we have not been authorized to sell it.

Mr. ANDERSON. There is no authority for selling it?

Mr. MARVIN. No, sir. You know that place was examined by a commission that the Congress appointed; the commission reported, and the matter is in the hands of the Committee on Agriculture. The recommendation of the commission was that the Secretary of Agriculture be authorized to sell under certain restrictions and proper limitations. I think that is the best action to take, but in the meantime we are compelled to care for the buildings and grounds.

Mr. ANDERSON. That authority has not been given?

Mr. MARVIN. No, sir; not yet. The $200 for each building did not include the Mount Weather property; that was $200 for the other 48 observatory buildings scattered throughout the country.

REPAIR TO CABLES.

There is a final item there, Mr. Chairman, of $3,000, submitted for repairs to cables. We have, as you know, quite a number of short cables and coastal telegraph lines that we have been operating for meterological purposes which now have quite a commercial value, by reason of the amount of commercial business conducted over them; and these have been maintained as required by law by the bureau. We are facing some further expenditures for repairs that can not be met from existing funds, and I am submitting an item of $3,000, as part of the $19,500, to cover the amount of cable repairs estimated.

Mr. ANDERSON. You get some tolls from these cables?

Mr. MARVIN. We do, Mr. Chairman.

Mr. ANDERSON. Have you the figures on that?

Mr. MARVIN. I reported that in my annual report. I gave a detailed table aggregating $6,281.01 for all the lines that are under our control, the repair and maintenance of which would be covered here. So I think you can really see that this is a justifiable increase of the appropriation.

We have a cable line between the mainland and Block Island that is about 18 years old, and it is in pretty bad condition. It has three wires in it. We use one for telegraphic reports of the Weather Bureau and two for the commercial telephone business between the island and the mainland. We are receiving $600 a year revenue from the telephone company for the two wires. In addition, we got $728.01 last year for commercial messages. That cable is pretty nearly "all in." It has been there for 18 years or more, and it has been repaired several times. It was reported some time ago to be in bad condition, and we had an investigation made. It is still serviceable, but I think it will be only a short time before we will have to put in a new cable. As I say, there is over $1,300 a year revenue right there, and a total for all lines of $6,281.01.

Mr. **Marvin**. It is about 11 miles. We have a total of cable aggregating something like 79 miles, but they are mostly short lines. One of the longer ones is at Tatoosh Island, and connects the island with Port Crescent, Wash. That is the outlet for the naval radio station on the island, which handles a great deal of the radio work of the North Pacific Ocean in that section.

ELIMINATION OF RESTRICTIONS ON SALARIES, ETC.

Mr. **Anderson**. You are proposing to eliminate from this paragraph the language "including not to exceed $697,080 for salaries; $129,040 for special observations, and reports; and $295,750 for telegraphing and telephoning," which would leave that item in one lump sum without the amounts indicated. Will you tell us what the reasons for that are?

Mr. **Marvin**. Mr. Chairman, as you see, by fixing those amounts we are limited in our latitude of expenditures—they are "not to exceed" sums. That in a certain way handicaps us more or less seriously in the economic utilization of these funds. If there is a surplus in one fund and the other is short we can not exceed the amount limited there. It is a kind of a limitation that is not imposed upon other appropriations so far as I know.

We requested a year ago that that restriction be eliminated, and the language was omitted in the report of the committee. I hope the committee will report it that way again this year.

Mr. **Anderson**. It did not seem to do any good.

Mr. **Marvin**. It happened that it did not do any good then, but it is a good move. We have only so much money in the out-of-Washington appropriation for our field service. We are obliged to perform the service, and it gives a better latitude in handling the money without that restricting language.

That covers, I believe, the several items of increase, (a), (b), (c), (d), and (e), including the subdivisions of item (e) covering the rents and increased cost of instruments and supplies. These are all for field work, repairs for buildings, cable repairs, etc.

PROTECTION OF HORTICULTURAL INTERESTS FROM FROST DAMAGE.

Mr. **Anderson**. The next item, page 17, for investigations, observations, and reports, forecasts, warnings and advices for the protection of horticultural interests from frost damage, an increase of $3,000.

Mr. **Marvin**. That item went in last year. We had an estimate for that item, which was omitted by the House but allowed by the Senate and finally passed, for $9,000.

The work provided for there has reference to the protection of citrus and deciduous fruit orchards, from frosts by artificial heating. I am sure you all know something about that work, but in the West, especially in Washington, Oregon, and California, to some extent in New Mexico, Colorado, and Florida, and to a less extent elsewhere, orchardists organize to artifically protect their orchards by heating when frost conditions menace. The economical success of doing that depends on not burning oil unnecessarily, but burning it when it is needed. The Weather Bureau has the information and gives advice as to when such work can be done successfully and economically.

I had a letter here a moment ago, just received on the 9th of February, from one of the citrus exchanges in southern California. It gives such a good picture of the general effects of this service that I would like to have you permit me to read it [reading]:

CORONA, CALIF., *February 3, 1922.*

UNITED STATES WEATHER BUREAU,
Washington, D. C.

GENTLEMEN: We want to express to you our appreciation for the services rendered us during the winter months in having your Mr. Whitney stationed in Corona making observations as to temperatures and weather conditions.

You can readily realize that a forecast predicting a possible minimum temperature made from observations taken in the immediate locality effected has more of a tendency of keeping our growers "on their toes" than just a mere forecast of "freezing temperature" issued from an office situated 50 or more miles away.

When such a forecast is made our growers usually line up their help early and have their pots ready for immediate lighting, but on the forecast of freezing temperature, they wait until the alarm rings, then order out their men to make preparation for lighting, which usually allows the temperature to drop a number of degrees before many pots have been fired, and in many instances damage is done that could have been avoided had they had a prediction of a minimum temperature and taken the necessary precautions beforehand to meet the situation.

All our growers have nothing but praise for the services you have rendered us during our recent freeze, and we believe if you will continue this service each winter, commencing about November 1 and continuing until March 1, more of our growers will prepare for heating and that we will not suffer from frost damage to as great an extent as we have heretofore.

We trust that Congress will authorize an appropriation for your bureau sufficiently large to maintain this service on a larger scale, and that we will again be favored with this same service next year.

You remember they had a very bad frost in California this year.

Mr. ANDERSON. Do you have to maintain a special force of people to make these observations and reports with reference to frosts?

Mr. MARVIN. The work is like this, Mr. Chairman: We have under this appropriation a small group of men, two or three only, and these men are now in southern California. They are just about to move away from that region up into the more northern region as the season advances northward. The purpose is to establish local offices near or immediately contiguous to the orchards during the critical frost period. Our official receives our weather reports and full information. His close contact with the organized orchardists enables him to adapt and apply the weather reports to the successful protection of the orchards.

The general warning, or what the writer of the letter quoted above calls a warning of freezing temperatures, is really sent out from San Francisco, where forecasts are made for the entire Pacific Coast States. Our man at Corona, for instance, receives the general forecast and also the detailed weather reports, including reports from points in the orchards. He prepares a map from the evening observations and from that map and from the studies he has made of local conditions an estimate is made of the minimum temperature that is likely to occur during the night.

This minimum temperature warning is given to the different orchards; the minimum temperature may not be the same for the different orchards. The orchardists get their men in the field and start lighting operations, and accomplish the actual warming of the orchards during the period of drop in temperature without unnecessary firing of oils and make an economic success of the service.

Our men on duty in southern California move northward later and serve all interests in the Pacific coast district which are organized to be benefited.

That service needs trained men. You can see that an untrained man can not do such work; and during the summer part of the year there are other fields of work in which he is engaged. In the first place, the men have reports to make and studies and investigations to carry on in connection with the art of making minimum temperature forecasts from local reports. The frost season at any one locality is not very long, and a few men can do an immense amount of beneficial work.

Mr. ANDERSON. Is this service performed only in California?

Mr. MARVIN. In the form in which it is outlined here, in California, Oregon, and Washington, and to some extent in Colorado, New Mexico and Florida. We do not conduct fully organized work in these latter sections as yet. We are not operating this service excepting at the places where the orchardists are organized to use it, because the warnings would do no good if there is no organization in the orchards to utilize them.

Mr. LEE. That is the same system that is used in Florida, it it not?

Mr. MARVIN. The same system; yes, sir. The experiences of the bureau have convinced the growers out there that this is a profitable thing, though a few years ago there were injunctions in the courts against heating of orchards on account of the soot and smoke it made and troublesome things of that kind. That occurred in Oregon, I believe it was, but there has been quite a change of view in regard to it from the results of the experience of orchardists who have fired. Moreover, it has been demonstrated convincingly that heat is what you want rather than smoke, and the southern orchardists now, more particularly in California, have developed a type of heater that burns very vigorously and makes a very hot fire with a limited amount of smoke, so that it is a real warming process.

Mr. ANDERSON. It must be rather an interesting undertaking to warm up the whole out doors, but I guess they can do it?

Mr. MARVIN. There is a very interesting physical reason why that is possible. You know, as you go up in this room that it gets awfully hot up near the ceiling. During the cold clear nights when it is still the same thing happens in the air outside. It gets warmer as you go up, and we have built some towers to test these relatively warm temperatures a little above the tree tops, perhaps. Air at the ground which is moderately heated does not rise indefinitely; it just goes up a moderate distance to where its temperature is the same as the surrounding air. This warm air above is really a "ceiling" above the orchard. You are just making a more nearly uniform temperature from that "ceiling condition" downward.

This very briefly explains the practicability of heating the orchards.

Mr. LEE. Doctor, how long will those pots burn?

Mr. MARVIN. They burn all night if necessary. They have to fill them sometimes, depending on the length of time required to pass through the minimum temperature. The saving comes from not firing too early. Orchardists in the early days felt that they had to begin right away to burn fires, but now they hold off firing until the last minute, until the temperature gets down to the danger point, and then they simply hold that temperature until the morning comes.

I can assure you that this is a highly beneficial service, and if you put up the amount of this appropriation alongside of what the losses would be in those orchards out there, there is no comparison.

Mr. WASON. It occurs to me that these orchardists ought to provide these men, and that the Government should only have to furnish the information.

Mr. MARVIN. You know we furnish men only to give the information. You can not, as this gentleman here says in this letter, turn over to the orchardists the information that it is going to freeze to-night; the amount of information that would be in his possession is not sufficient for him. He wants the guidance of the trained meteorologist in that locality to receive our reports first and to make official use of them in disseminating the correct advices and information.

It is very largely on a cooperative basis at the present time. You see, the orchardists have to furnish all the pots and do all the firing, and have all the men to go over the orchards and light these fires. We furnish no men for that purpose; we simply have one or two men on the job to give them advice.

Mr. WASON. I know it is small, but it is a commercial proposition. If the service requires such a man as you suggest, why should not the orchardists make a contribution to reimburse the Government for the Government's expense in putting a man into that country, just the same as that if for some reason it is advisable to protect some growing crop, where the Government would assist a farmer and put a man there to advise him and see that it is done properly; and why should not the orchardist who is raising the crop of fruit reimburse the Government for the few weeks or one month that the man stays there?

Mr. MARVIN. I can say there is very cordial cooperation with those local communities in furnishing assistance. They do a great deal in helping the observer travel about the region. We have a number of people who give us certain observations and reports in return, but at the same time there has been up to the present time no effort to impose a compensation or reimbursement to the Government for those services. It is the same way, I think, that it would be for our flood-warning services.

If you applied that principle you might say that the same might apply to the commercial and business concerns in Pittsburgh who are advised that the water is going to come above a certain level, which means to them that they have got to move their stores all out of the low places in the city to upper floors, as the water is going to flood the ground floors. The flood waters recede, they have moved their stores and saved everything by it, and have benefited by our warning, and you might say for the same reason they should reimburse the Government for the services rendered in that kind of a case.

You see this forecasting work can only be done by trained meteorologists using the meteorological reports that the Weather Bureau collects. There is no other agency which can collect these observations or arrive at an intelligent conclusion as to when, where, and how certain meteorological conditions will occur, and it does not seem to me to be inconsistent with the type of service that the Weather Bureau is performing throughout its whole organization to give this service to the orchardists.

Mr. **Wason**. This is increasing year by year; other parts of the country will want it as time goes on. Fruit growers want it in the spring time when the trees are in blossom?

Mr. **Marvin**. That is a matter of policy and principle that is very important, obviously.

Mr. **Wason**. I think it is very meritorious, but in a business sense I was wondering whether it was justified.

Mr. **Marvin**. Of course, this bureau is required by its organic act to collect meterological information and give advices and warnings of cold waves, storms, floods, frosts, and all such weather phenomena for the benefit of commerce, agriculture, and navigation. The organic act declares that such was the intention of Congress in creating this organization. One of the things we are called upon to do at this time is to give advices and information in aid of aviation. I have just shown you how we give advices and information to ships to enable them to avoid hurricanes and advices and information in regard to floods. This is advice and information in regard to frosts. We give minimum temperature forecasts and advice and information to the commission merchants and shippers by which they are able to transport perishable products during the winter without losses and claims for damages. There is an enormous economy there from the service we give.

Every one of these is a kind of a service to some relatively local community and local group of people, but in the aggregate it is for the benefit of commerce, agriculture, and navigation, and that is the organic act, and we are working on that basis.

Mr. **Wason**. But you are carrying your suggestion a bit further in conveying your advice, because you put a man right on the job yourself to direct.

Mr. **Marvin**. That happens to be incidental. Our man in charge of the hurricane warnings is just as much a local man on that particular responsibility. The man in New Orleans, for instance, at times of impending hurricanes advises the railroads how long it is safe to ferry their trains across the Mississippi River. When he tells them it is unsafe they stop. We are giving special advices to the people all the time.

Of course, in these orchards we put a man in there temporarily, but he is on some other lines of work at other times of the year, and in the summer time on the Pacific Coast quite a bit of time is taken up in special forecasts for forest fires, rain, and wind forecasts in connections with the forest fire situation.

These men pass from one kind of service in the frost season to another kind of service during another season. They are occupied all the time along a line of beneficial service to the public.

OFFICIAL TRAVELING EXPENSES.

Mr. **Anderson**. We will now take up page 18, official traveling expenses; no change in that item?

MAINTENANCE OF STATIONS FOR OBSERVING ATMOSPHERIC PHENOMENA.

Mr. **Marvin**. No change there. The only and final item is the item on page 19, for maintenance of stations for observing, measuring, and investigating atmospheric phenomena, including salaries, travel, and other expenses in Washington or elsewhere.

Mr. **Anderson**. That is a research item, I take it?

Mr. **Marvin**. Research and upper air observation work. It is on the reports and advices we receive under this activity that we are helped very greatly in general weather forecasts for the entire United States. Without them the forecasts and warnings for aviation and navigation of the air would be impossible.

Mr. **Anderson**. Are you developing anything startling as a result of these upper air studies?

Mr. **Marvin**. We have gotten a line on some very important results from a few observations made at San Juan, Mr. Chairman, particularly the question of trade winds and what their depth is and why it is that hurricanes form and form only infrequently, you might say. Why do we not have a hurricane right along every few days? Fortunately, we do not. A short series of observations were made at San Juan with pilot balloons, showing that the trade wind sometimes goes up to great heights, and other times it prevails only near the surface of the earth. This program of investigating atmospheric phenomena with little balloons is one of the means by which we hope to get information concerning the bigger problems of the circulation of the atmosphere.

It is by means of the information we have gotten from our balloon stations all over the country, in conjunction with the better organization of the hurricane service, that we are able to make better forecasts. I think the accuracy of the warnings, especially with reference to the great storms, as well as to the minor features of the weather, is greater than it has ever been heretofore. The experts who have been working on that for years have come to a state of knowledge of the situation that enables them to make advices and warnings that are much more precise and exact than they have been heretofore. The changes that we see in the weather from day to day are some of the most difficult things to forecast.

There has not been a serious disaster on the Great Lakes for several years, and I think that is traceable to the Weather Bureau warnings. The advices and information we have given to the people there and the extent to which they have heeded these advices, taken together, has meant safety on the Great Lakes far in excess of what it was many years ago. The lake carriers and mariners observe our warnings and heed them; when the danger is shown them they stay in port, and they take many precautions they did not use to do years ago. The accuracy of our warnings justify them in doing that, and in turn they desire more service, advice, and information.

This item here for investigations of atmospheric phenomena is exactly the same as it has been, with the exception of a reduction by transfer of two clerks to the statutory roll. The action of Congress in encouraging and regulating aviation in the country, through the establishing of a Bureau of Aeronautics in the Department of Commerce, is going to require the Weather Bureau to furnish additional meteorological and aeronautical information. It comes right back to us; we are the one organization in the Government that is in a position to do this additional work. It will require additional observations in the free air. We have only six stations now making primary observations, and 15 or 20 in addition using the little pilot balloons; such observations do not cover the whole United States, and will not properly represent conditions when you come to have definite air routes established and travel over those routes more or less daily. Aviators call on us daily for advices and information which we must be prepared to give them, because if we do not give it some other agency will have to be created to do so.

Mr. ANDERSON. Is the Army or Navy department maintaining any service of this sort now?

Mr. MARVIN. Only at local points, and in no way duplicating our work. At certain flying posts and at naval bases they have stations at which they make observations by means of pilot balloons. Those observations are immediately telegraphed to us just as if the place was a weather bureau station. The reports go on to our maps, and we in turn give them the advices concerning the general flying conditions over courses that have been mapped out.

Mr. ANDERSON. In the development of the meteorologists, they are educated in the bureau as a rule, are they not?

Mr. MARVIN. There are just a few of the universities that give courses in meteorology. Harvard University, Clark University, Cornell University, Chicago University, Madison, Wis., Berkeley, Calif., Columbia, Mo., Lansing, Mich., and a few others.

Mr. ANDERSON. Do you get any of those people in the service?

Mr. MARVIN. None of those universities train professional forecasters. We get some students who take those courses but our salary grades do not attract many. In most cases the men are trained in climatology or in meteorology in connection with agriculture. The technical forecasting work of the Weather Bureau, which is the greatest problem we have, is only just beginning to be taught in the universities at all.

Mr. ANDERSON. How does a man learn to become a forecaster, then?

Mr. MARVIN. Thus far we have been successful in only one way. The men must come into the Weather Bureau and take up our work, study the maps and make practice forecasts and work with our experienced men. They serve in a subordinate capacity, and as they show aptitude for this work, are given assignments as assistant district forecasters. We have five forecast centers: Washington, Chicago, Denver, San Francisco, and New Orleans.

Mr. ANDERSON. I think that completes the bill for the Weather Bureau.

THURSDAY, FEBRUARY 9, 1922.

BUREAU OF AGRICULTURAL ECONOMICS.

STATEMENTS OF HON. HENRY C. WALLACE, SECRETARY OF AGRICULTURE; DR. H. C. TAYLOR, CHIEF, BUREAU OF MARKETS AND CROP ESTIMATES; MR. LEON M. ESTABROOK, ASSOCIATE CHIEF, BUREAU OF MARKETS AND CROP ESTIMATES; MR. LLOYD S. TENNY, ASSISTANT CHIEF, BUREAU OF MARKETS AND CROP ESTIMATES; MR. CHESTER MORRILL, ASSISTANT TO THE SECRETARY OF AGRICULTURE; MR. C. W. FORSTER, ACTING CHIEF, OFFICE OF FARM MANAGEMENT AND FARM ECONOMICS; MR. H. E. ERDMAN, SPECIALIST IN COST ACCOUNTING; MR. WILLIAM R. MEADOWS, COTTON TECHNOLOGIST; DR. O. E. BAKER, AGRICULTURAL ECONOMIST; DR. L. C. GRAY, AGRICULTURAL ECONOMIST; DR. C. J. GALPIN, ECONOMIST, FARM LIFE STUDIES; MR. VICTOR N. VALGREN, ASSOCIATE AGRICULTURAL ECONOMIST; MR. WELLS A. SHERMAN, SPECIALIST IN MARKET SURVEYS; AND MR. W. A. WHEELER, SPECIALIST IN MARKETING INFORMATION.

Mr. ANDERSON. The committee this morning will take up the Bureau of Markets and Crop Estimates, which under the estimate as submitted is combined with the Bureau of Farm Management under the new title of Bureau of Agricultural Economics, beginning on page 18 of the estimates. Mr. Taylor, do you wish to make a preliminary statement?

GENERAL STATEMENT.

Mr. TAYLOR. Last May the Secretary of Agriculture appointed a committee for the purpose of considering the economic work in the Department of Agriculture, and how it could best be organized to meet the needs of the farmer. After due consideration, the committee recommended to the Secretary the consolidation of all the economic work in the department which was formerly in the Bureau of Crop Estimates and the Bureau of Markets and the Office of Farm Management and Farm Economics. It is believed that the interrelated work of these three separate divisions of the department could be organized more effectively in one bureau.

Some progress has already been made in the consolidation work. One July 1, 1921, under authority granted in the last appropriation bill the Bureau of Markets and the Bureau of Crop Estimates were united under the title of the Bureau of Markets and Crop Estimates.

The Secretary of Agriculture asked that the work of this new combined bureau and the work of the Office of Farm Management and Farm Economics be carried forward in as close conjunction as possible, and that the estimates be drawn looking toward the ultimate consolidation of the Office of Farm Management and Farm Economics with the Bureau of Crop Estimates, in the next appropriation bill.

The plan as it is worked out and as it is presented in the appropriation bill is seen in the chart, a copy of which can be provided for the committee, and in this chart those items which were formerly in the Office of Farm Management and Farm Economics have the asterisk before them as a means of indicating where they formerly were located. The rest of the subject matter was all in the combined Bureau of Markets and Crop Estimates.

The first item is farm management and farm practice. It was all in the Office of Farm Management. The second item, cost of production and distribution, is partly in the Office of Farm Management and partly in the Bureau of Markets and Crop Estimates. Marketing and distribution studies were all in the Bureau of Markets and Crop Estimates, and the appropriation corresponding to that title and the appropriation for the market inspection of perishable foods and the market service, together, make up the appropriations that are used in conducting the marketing divisions relating to cotton, live stock, meats, and wool, dairy and poultry products, and fruits and vegetables, grain, hay, feed, and seed; so that these three appropriations that are separate in the bill are united in these commodity divisions in operation of the work of the bureau.

Mr. ANDERSON. May I ask you there whether in this reorganization the activities of the new bureau will be directed along commodity lines rather than along functional lines?

Mr. TAYLOR. The idea is that in the main, and so far as possible, the work will be conducted along commodity lines. Special emphasis will be given to work along commodity lines.

On the other hand, as the work proceeds and work along commodity lines has been fairly well developed along several lines, and common functions in different lines of marketing have come to be well understood, attention will be given also to the correlation of the work in the different commodity lines, with a view to developing the general principles involved, as well as their application in the special field.

I wish to make a few statements in regard to the common problem to which these three bureaus which are being consolidated address themselves.

The farmer struggling to produce and sell products at a profit is the starting point in all this work. On the other hand, an objective which is ever kept in mind is an adequate food supply for a growing nation produced by farmers working and living under satisfactory conditions.

The time was when those engaged in the study of farm-management problems assumed that by making an analysis of the work on an individual farm, plans for efficient farm management could be worked out. Now it is generally recognized that in order to lay plans for the efficient organization of a farm, the market conditions, as well as the facts relating to the particular farm, must be kept clearly in mind. That the farm management involved the study of the markets as well as the study of the farms.

A wise decision as to what to produce on a given farm requires a knowledge of the opportunities for marketing; and a basis of making a forecast as to what the probable price of the different products will be at the time when they will be for sale.

The territory that must be held in mind in deciding what to produce is larger for some products than others, but even for perishable products, fruits and vegetables, the production throughout the whole United States has to be kept in mind when the farmer is deciding whether or not to go into the production of a given line of fruits or vegetables. But when it comes to articles like wheat and cotton, the whole world is the field of competition and the market; and information regarding production and consumption throughout the world is essential if the farmer is to be in a position to act intelligently.

The complexity of the farmers' economic problem arises out of this fact, that in planning and working and producing he is in competition with millions of farmers throughout this country and in other countries, and in order that he may act intelligently information regarding his competitors as well as regarding his market is essential. At the present time the deplorable condition of the farmer is due largely to a wrong ratio of exchange between the prices of the products which he sells and the prices of the products which he buys. Whether the things he buys are machinery, land, or articles for consumption this is true.

In a large measure these conditions of production and demand throughout the world which determine what the farmer should produce are beyond his control, and the thing we can do is to gather the facts which will put him in a position to adjust himself to his market conditions.

Events in Europe in recent years have very definitely determined the farmers' present situation, and one of the things that we are trying to do at the present time is to get a clear understanding of the European situation, the rapidity with which the buying power of Europe is coming back so that our products may be purchased, and the rapidity with which those countries in eastern Europe which compete with us are coming back to the point of getting their products on the market again.

One of the first problems that the farmer meets is the problem of getting an equipped farm. This involves the tenancy question, the question of good credit institutions and reasonable rates of interest, as well as the question of the proper choice of a farm and the proper choice of equipment.

In studying the choice of equipment, in particular, this bureau cooperates with the Bureau of Public Roads and the Bureau of Animal Industry, notably in the work of the Farm Power Committee, in which the three bureaus have jointly worked on the problem of choice of forms of farm power, and the relative choice of horsepower and tractor power.

Questions of efficient farm organization relate both to the question of the efficient production of a given crop with a view to keeping the cost down, and also to combination of different enterprises in such a way as to provide profitable work each season of the year.

Certain marketing problems have to be taken care of on the farm. The first marketing problem the farmer who produces a feedable crop has to solve is whether or not to sell the crop in its original form or feed it to live stock, and in order to solve this problem he must have clearly in mind the market conditions both for the raw material and for the product; as for example at the present time, while corn can be sold at a very low figure, hogs are selling at a relatively high price in comparison with the price of corn.

Mr. ANDERSON. Has there ever been a time in your recollection, or do statistics show any time, when the price of corn was as much out of line with the price of hogs as it is now?

Mr. **Taylor**. Yes, in 1910 a similar condition existed. Prior to 1908 corn and hogs had run along for a series of years at a ratio that made it just nicely profitable to feed the corn to hogs. Then in 1907 there was an oversupply of hogs, the price of hogs fell and the price of corn rose. This condition made many farmers feel that it was better to sell corn than to feed it to hogs. This state of mind on the part of farmers resulted in a reaction of the supply of hogs that sent hog prices very high in the autumn of 1909 and throughout the year 1910. Corn prices started down in the fall of 1909 and throughout 1910 it was far more profitable to feed corn to hogs than to sell corn. Hogs consume such a large proportion of the total corn crop that any important change in the demand for corn to feed to hogs is bound to have a very material effect upon the price of corn.

Another important phase of marketing that has to receive the very careful attention of the farmer is the question of preparing products for the market, particularly the matter of producing the right grade, the grade that will sell for the best prices, if that is the economical thing to do; that is, if considering costs of production and marketing this grade will net the farmer the largest profit. It is, of course, sometimes true, that on a given farm the fancy grade can not be produced at a cost that will make it feasible to produce in competition with others.

Then the question of packing must receive the attention of the farmer. The form in which an article is packed for the market may make a very small difference in the total cost of getting it on the market, but it may, on the other hand, turn the whole scale and determine whether or not it can be sold at a profit.

The question of when to market is a question that the farmer can not act intelligently upon unless he has before him the facts with regard to total production, the probable demand, and the rate at which other people are selling, and probably other facts which would give him a basis of deciding whether to sell at once, to sell gradually through the year, or to hold the whole supply until the latter part of the season.

The way in which the farmer should market his product, whether he had better sell independently, and if so whether he should sell in the central market or to a local dealer, or join with his neighbors in a cooperative selling organization are questions with regard to which there is too little information. This is a subject which is being given considerable attention at the present time, looking toward a better basis of judgment.

The real work of the new Bureau of Agricultural Economics is to put the farmer and the dealer in farm products in possession of the facts they need in order to act wisely in all these problems of production and marketing, and to provide such service and supervision as will tend to establish efficiency and fair play in the marketing of farm products.

Mr. **Anderson**. Perhaps you intend to discuss it anyway, but I should like to ask you one question for information. Is it expected that the investigations under this bureau will end with what are ordinarily termed marketing transactions, or is it expected to go into the whole field of distribution?

Mr. **Taylor**. It is expected that the work of this bureau will go into the whole field of agricultural marketing, the marketing of the farmer's products, but not, of course, into the marketing of the products of industry in general.

Mr. **Anderson**. When you say the marketing of farm products, do you mean you expect to follow, for instance, the marketing of wheat through to the final consumer, or that you intend to confine yourself to the marketing of wheat as wheat?

Mr. **Taylor**. The farmer is interested in the following of his product through to the consumer. As a matter of fact, the work which we will do will be more intensive in the earlier stages, leading up to the point, for instance, where the wheat is converted into flour.

In the case of meat, we are interested in following it to the consumer, and at the present time we are studying not only the cost of local marketing of live stock and the handling of live stock in the stock yards and getting them sold to the packers, but we are also interested in the wholesaling and retailing of meat and have been making a study, which will be reported on later under the proper heading, of the cost of retailing meat and the influence of this upon the consumption of meat and, in turn, upon the prices of the farmer's product.

Mr. **Anderson**. If I may interject again, I asked the question because I have rather a definite notion about this proposition myself. I can not say I have convictions about it, because we have not got far enough to justify us in having convictions. So far, apparently, the problem of marketing from producer to consumer is one problem. That is to say, I think it is quite clear, recognizing the fact that fluctuations redound for the most part to the advantage of the intermediate distributors, that on the whole every definite addition to cost of distribution finds a very definite and a fairly prompt reflection in a reduced price to the producer or an increased price to the consumer, and perhaps both, and that practically every economy effected in methods of distribution finds a pretty prompt reflection and very definite reflection in the price paid to the producer; so that it does resolve itself into one problem, from the farmer's point of view, because it does not avail him very much even if he gets a good price if all of it is absorbed in cost of production or in cost of distribution, which leaves him at or below the cost of production.

While I recognize the fact that the problem is so big that an attempt to follow every commodity from producer to consumer, and keep a definite record of progress of costs along the line, is probably impossible, I do think that there ought to be a conception of the fact that it is one problem and has to be considered from that angle.

Mr. **Taylor**. In order that the bureau shall be in a position to provide farmers and others with the information that will give them the basis of intelligent action—because we must recognize that in the main all action is voluntary action—it is necessary to have such information as can be gotten by cost of production studies, the cost of marketing, the statistics of production, the stocks, demands, and prices for each product throughout the producing area, whether that be a local area or the whole world. It is necessary also to know the conditions which are bringing about changes in production in any part of the world or in any part of the producing area or in any part of the consuming area, in order that we may quickly adjust ourselves.

When the farmer finds the price low in a given year and an apparent excess of his product, the first thing he needs to know is whether or not that is a temporary or a permanent change. If it is a temporary change, a temporary condition, he, of course, does not want to reorganize his farm so as to adjust himself to it. On the other hand, if it is a permanent change, then the more quickly he adjusts himself to it the better.

In England, toward the latter part of the last century when American wheat commenced to come into the English market at such a low price, wheat production was no longer profitable in the east of England. The alert younger farmers, who recognized this, went into the dairy business and commenced to make money. Those who insisted on continuing to produce wheat, without recognizing that there was a permanent change of market conditions that made wheat no longer profitable, continued to raise wheat and to lose money until they were bankrupt, and in parts of England land went out of cultivation for a time, until the farmers finally saw that by getting out of grain production and getting into the dairy business they could secure a profit.

I simply give that as an illustration of the way in which it is important to have available information that will make clear to the farmers whether it is time for a readjustment, or simply time for tiding through a temporary condition.

In making these studies it is not sufficient simply to know the facts regarding the present. We must study these problems from a standpoint of past experience. That means we need to study agricultural and industrial history. We need to study them broadly, from the standpoint of the effect of geographical influences, as well as from the standpoint of the statistics of the present.

In the field of marketing, particularly, the work of the bureau has been developed rapidly in those lines which give promise of immediate aid to the farmers. The news service, the inspection service, the licensing of warehouses, the enforcement of standard grades, etc., have been rapidly developed, and should be improved and with due care extended.

The next important step forward is the development of the research work in the economic problems of production and marketing. We are striving to gather the facts which will make a clear picture of what takes place in the whole field of production and marketing, provide the daily news service to keep this up to date, and provide all agencies for putting this picture into the minds of the farmers as a basis of more intelligent voluntary action in producing and marketing farm products. It is a large task, and it will be accomplished only through persistent work through a long series of years; but in the meantime, immediate aid is being given to the service and regulatory work which is being improved as the result of the developments of the research work.

With regard to the name of the new bureau, it has been thought that the term "agricultural economics" is comprehensive enough to include all the work that has formerly been carried in the three bureaus and that the titles of the old bureaus, such as farm management, crop estimates, and markets, can be used effectively as designations of particular subdivisions of the work of the bureau.

Mr. ANDERSON. Quite a number of people have spoken to me recently about this proposed change in title. Many of them think it is a great mistake to leave out of this title the word "markets." I am not so sure they are not right. The Bureau of Markets, through its regulatory, service, and investigational work, has established a contact, it has sort of acquired a trade name, which I think is of very great value to the department. I think you would be losing a good deal in losing the value of that trade name. It is just as valuable to the Department of Agriculture as a trade name is to an industrial organization.

While I think that the reorganization is probably eminently desirable, I have some doubts in my own mind about the wisdom of dropping the word "markets" out of the title of this bureau.

Mr. TAYLOR. From the scientific point of view the title that is being proposed is the most satisfactory title. From the more practical point of view it is easy to see how, for the present at least, something would be lost if the word "markets" were dropped. The question that has arisen in our minds is whether nor not, by using "markets," "farm management," and "crop estimates," as designations for important subdivisions of the work, we would not be able to retain the value that is in the term "markets" as a trade name. I should hesitate very much to entirely drop the term "markets," because I recognize its value. As a matter of fact, a very great deal of the marketing work is now being handled under specific designations, as, for instance, in Chicago and in New Orleans and in New York and Philadelphia and Boston, wherever we have our grain supervision work, you will find on the door the title "United States Department of Agriculture, Federal Grain Supervision," which is a subtitle under "Markets," and the word "markets" usually is not found on the door, but of course on the letterheads the word "markets" is used.

In the fruit and vegetable inspection service the practice is not the same. The term "markets" is usually connected with the title. I think that in deciding this matter both the immediate and the long-time points of view should receive careful consideration. I remember the time when the word "protein" was looked upon by the Wisconsin farmer as a highbrow word. It gradually worked into his vocabulary, and at the present time any Wisconsin dairyman uses the word and does not buy feed or sell milk without thinking in terms of the protein content; and it is a question whether in the long run it is not better to take the scientific term which best describes the whole field and educate those interested to the title and in the meantime save, by some means, as nearly all the value of the old trade name as we can. That is a matter on which there can easily be differences in judgment in making the final decision.

Mr. ANDERSON. I was interested in getting your point of view on the proposition.

Mr. TAYLOR. As a matter of fact, there is no work of a service and regulatory character which in reality is not economic work. The inspection work is the rendering of a service which makes it possible to adjust the economic relations between the buyer and the seller. My attitude with regard to the matter is to try to present the matter in the broadest possible way, and accept the best judgment of your committee in the matter.

One other matter might be mentioned in connection with the consolidation, and that is the increased efficiency that is clearly resulting from the closer correlation of the lines of work. I took charge of the work on the 1st day of July, and on the 2d day of July called to my office all of those who were working on the problem of price relations, that being a problem in which everybody was so much interested at that time. I found five different points in the three bureaus where price relations were being studied more or less intensively. By getting these eight or nine people together around a table and organizing a committee on the study of price relations and putting the work in charge of a chairman, the accomplishments that had already been attained by the different groups were brought together, and the work started forward with not over one-fourth of the number of persons connected with it permanently, and yet all of them advising, through the committee, with regard to the best way and most effective way to carry forward the work.

There, of course, will be some financial economies by throwing three accounting offices together, and the personnel offices.

Mr. ANDERSON. When you say "accounting offices," do you mean administrative accounting offices or accounting offices which have to do with your investigational work?

Mr. TAYLOR. I mean the administrative accounting offices, and the administrative files, and all of the administrative work. Instead of having three sets of offices, by consolidating them all along the line, a very considerable economy can be made.

Mr. ANDERSON. Are there any questions on the general policy?

Mr. BUCHANAN. You stated—very properly so, I think—that you would follow the progress of the product from the producer, the farmer, to the ultimate consumer. Do you make any investigation relative to the things that the farmer has to buy—the manufactured things and products?

Mr. TAYLOR. In our studies on cooperative buying and selling, attention is given to the question of organizing for the purpose of buying as well as selling; but practically all of our work relates to the outgo of the farmers' products toward the consumer.

Mr. BUCHANAN. You do not go into the prices at which the farmer has to buy? My idea is, that the farmer has to buy, and it is of some value to him to know the supply on hand, and whether it is better for him to buy right then, or to wait a little while; and I wanted to know whether you had any facts along that line, as you were investigating the facts of it.

Mr. TAYLOR. With regard to such products as hay and grain and wheat.

Mr. BUCHANAN. Of course you do, because those are farm products.

Mr. TAYLOR. But in regard to farm machinery, we have not done anything along that line.

Mr. BUCHANAN. Of course that would broaden the inquiry to include practically all manufactured products, because the farmer constitutes about 48 per cent of the population of the United States, and he would necessarily buy practically all of the manufactured products. It would possibly broaden the inquiry to an extent that might involve the sale of that part of it even more than the sale of farm products. All right.

SALARIES.

Mr. ANDERSON. Now we will take up your statutory roll, the item on page 213.

Mr. TAYLOR. With regard to the changes in the statutory roll, I will pass to each member of the committee a brief statement which I would like to have put in the record, and also a more detailed statement of the statutory roll, showing those positions which are in the Bureau of Markets and Crop Estimates for the current year, those who are in farm management and farm economics, those transferred to the Division of Publication, and the new places, which in all cases are transfers from the lump sum. I shall be glad to read these two statements, so as to have them in the record.

Mr. ANDERSON. It is not necessary to read the items. Just file them with the stenographer and they will go into the record without reading.

Mr. TAYLOR. All right.

(The statements referred to are here printed in the record as follows):

Explanation of statutory roll, Bureau of Agricultural Economics.

Statutory roll, Farm Management and Farm Economics, 1922		$89,830	
Statutory roll, Bureau of Markets and Crop Estimates, 1922		838,630	
Total		928,460	
Promotion for chief of bureau		2,500	
Transfer from lump fund:			
Farm Management and Farm Economics	$11,980		
Bureau of Markets and Crop Estimates	56,860		
		68,840	
			$999,800
Decreases:			
Places dropped—			
Chief, Farm Management and Farm Economies	5,000		
Library assistant	900		
		5,900	
Transferred to the Division of Publications		25,960	
			31,860
Net total, 1923			967,940

Explanation of statutory roll.

	Markets and Crop Estimates, 1922.	Farm Management, 1922.	Total, 1922.	Transferred to Publications or dropped from roll.	New places.	Total, 1923.	Remarks.
Chief of bureau, at $5,000.	1	1	2	[1] 1		[2] 1	
Assistant to chief, at $2,520.		1	1				Designation changed to administrative assistant.
Chief clerk, at $2,000	1		1				Designation changed to executive clerk.
Administrative assistant, at $3,000.	1		1			1	
Administrative assistant, at $2,520.						1	By change of designation from assistant to chief.
Administrative assistant, at $2,500.	1		1			1	
Administrative assistant, at $1,800.	1		1				Designation changed to clerk, class 4.
Clerk in charge of supplies and accounts, at $2,250.	1		1				Designation changed to executive assistant.
Executive assistant, at $2,250.		1	1			2	1 by change of designation.
Executive clerks, at $2,000.	5		5		1	7	Do.
Executive clerks, at $1,980.	3		3	1		2	
Clerks, class 4	20	2	22			23	Do.
Clerks, class 3	37	4	41		2	43	
Clerks, class 2	70	7	77	3	8	82	
Clerks, at $1,320 each		2	2			2	
Clerks, class 1	220	18	238	2	22	258	
Clerks, at $1,100 each	65	3	68	2	3	69	
Clerks, at $1,080 each		4	4		3	7	
Clerks, at $1,000 each	95	15	110	3	9	116	
Clerks or draftsmen, at $1,440.		1	1		1	2	
Clerk or draftsman, at $1,020.		1	1			1	
Photographer at $1,400.	1	1	2			2	
Photographer at $1,200.	1		1			1	
Superintendent of telegraph, at $2,000.	1		1			1	
Supervising telegrapher, at $1,620.	1		1			1	
Telegraph operators, at $1,600 each.	5		5			5	
Telegraph operators, at $1,400 each.	47		47			47	
Telephone operators, $900 each.	2		2			2	
Telephone operator, at $840.	1		1			1	
Draftsman, at $1,800					1	1	
Draftsman, at $1,600					1	1	
Draftsman, at $1,400	1		1			1	
Draftsman at $1,380	1		1			1	
Draftsmen, at $1,200 each.	3	1	4			4	
Draftsman at $1,000	1		1			1	
Draftsman at $900	1		1			1	
Library assistant at $1,440.		1	1			1	
Library assistant at $900.		1	1	[1] 1			
Cartographer at $1,500.		1	1			1	
Custodian of supplies at $1,200.	1		1			1	
Machine operators, at $1,400 each	3		3	2		1	

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[1] Places dropped from the statutory roll. All other places in this column are transferred to the Division of Publications.

[2] At $7,500.

Explanation of statutory roll—Continued.

	Markets and Crop Estimates, 1922.	Farm Management, 1922.	Total, 1922.	Transferred to Publications or dropped from roll.	New places.	Total, 1923.	Remarks.
Machine operators, at $1,200 each.	4	....	4	4	....	....	
Machine operators, at $1,100 each.	2	....	2	....	....	2	
Machine operators, at $1,000 each.	11	....	11	2	1	10	
Machine operators, at $900 each.	3	....	3	....	....	3	
Chauffeurs, at $900 each.	3	....	3	....	....	3	
Skilled laborer, at $1,200.	1	....	1	....	....	1	
Skilled laborer at $1,000.	....	....	....	....	1	1	
Laborer at $900.......	5	....	5	....	1	6	
Laborer, at $840 each.	3	....	3	....	....	3	
Laborers, at $720 each.	10	....	10	1	3	12	
Laborers, at $660 each.	4	....	4	....	....	4	
Laborers, at $600 each.	5	....	5	....	....	5	
Laborers at $540 each..	2	....	2	....	....	2	
Messengers at $900 each.	4	....	4	....	....	4	
Messengers at $720 each.	2	....	2	1	....	1	
Messengers or laborer at $720.	....	1	1	....	....	1	
Messenger boys at $660 each.	3	1	4	1	....	3	
Messenger boys at $600 each.	12	....	12	....	1	13	
Messenger boys at $540 each.	15	....	15	....	....	15	
Messenger boys at $480 each.	20	3	23	1	....	22	
Charwomen at $540 each.	2	....	2	....	....	2	
Charwomen at $480 each.	6	1	7	....	....	7	
Charwomen at $360 each.	2	....	2	....	....	2	
Charwomen at $300 each.	6	....	6	....	....	6	
Charwomen at $240 each.	9	5	14	....	....	14	
Total..........	$838,630	$89,830	$928,460	$31,860	$68,840	$967,940	

Mr. **Anderson**. What was the statutory roll of the Bureau of Markets and Crop Estimates last year?

Miss **Clark**. $838,630.

Mr. **Taylor**. That is this second figure [indicating].

Mr. **Anderson**. As I recall, that last year accounted only for the transfer from the statutory roll of the Bureau of Crop Estimates to the combined bureau. It did not include any transfers from lump sum, with possibly two or three exceptions. Am I correct about that?

Mr. **Estabrook**. I think you are right about that.

Mr. **Anderson**. My recollection is that with one or two exceptions we did not allow any transfers from the lump-sum roll last year in making the combination, and all we did allow was the actual combination of the statutory roll of the two bureaus.

Miss **Clark**. With a slight increase.

Mr. **Anderson**. In five or six places only.

Miss **Clark**. That is all.

Mr. **Anderson**. Now, as to the estimate for the combined bureau, there appears to be a transfer from the lump-sum appropriations of all of the bureaus involved, of 58 employees, involving an aggregate transfer of $68,840. Most of those transfers appear to be transfers of clerks. Now I would like to know how those clerks got first on the lump-sum rolls.

Miss **Clark**. A number of them had been on the lump-sum rolls. Most of them were on the lump-sum rolls last year. A few new employees have gone on the lump-sum rolls.

The statutory roll never has carried all our clerks, since the bureau began, but this year, with these transfers, we count on the statutory roll completely covering the clerical force.

Mr. **Anderson**. Will these transfers take out of the lump-sum rolls all of the permanent clerks?

Miss **Clark**. All permanent clerks that are now being carried.

Mr. **Anderson**. Does it include, then, any increase or estimated increase of the lump-sum rolls? As I understand it, the practice is where a new lump-sum appropriation is made, that nominally you carry the additional clerks required on that lump-sum roll until the next fiscal year, when the transfer is made to the statutory roll; but there have been cases in which estimates have been submitted on the statutory roll to take care of clerical forces involved in new activities.

Miss **Clark**. Yes.

Mr. **Anderson**. What I would like to know is whether in making these estimates for the statutory roll, any allowance was made for the additional clerks in statutory positions that might be required by new activities or increased activities under lump sums.

Miss **Clark**. No; we transferred only the clerks who are now on the pay roll. We did not make any calculation for additional clerks. There may be increased activities, and we may possibly need a few lump-sum clerks; but we are counting on the saving that is being made in the administrative work through the consolidation of the three bureaus, to take care of all the clerical force on that roll.

Mr. **Anderson**. You think that the statutory roll as it is now here will be sufficient to cover not only present activities so far as clerical and statutory positions are concerned, but also the new activities proposed?

Miss **Clark**. Well, of course there are not so many new activities proposed in this bureau, the grain-futures act, and miscellaneous activities. They would require more clerks.

Mr. **Taylor**. But they are not in this bureau.

Miss **Clark**. They are not in this bureau.

Mr. **Anderson**. There are some new clerks?

Miss **Clark**. There are some increases in appropriations requested. There is a possibility of getting some few more lump-sum clerks, on occasion, temporarily. But we are counting on the statutory roll, with this $68,840 of additional transfers, being sufficient to carry the clerical work.

Mr. **Taylor**. On that point, the increases that will be used in the marketing and distribution fund will be expended on scientifically trained people. We are in need of more trained economists for doing research work. The question of whether the increase that is asked for in expanding the live-stock statistical work will require additional clerks as well as scientific men, is a question that I would like to have Mr. Estabrook answer. Mr. Estabrook, will you speak of that?

Mr. ESTABROOK. When we come to that item, you will find we are asking for an increase of $70,000 specifically for the purpose of developing live-stock reports, and we are proposing to use that fund for live-stock specialists entirely. In our own program we have not contemplated using any of that $70,000 for additional clerks. It may be necessary here and there to take on one temporarily, but we think of it as being necessary solely for the employment of live-stock specialists and their travel, and the additional equipment as it may be necessary.

Mr. ANDERSON. I was trying to arrive at some basis, intangible as it might be under the circumstances, by which we could measure somewhat, at least, the increased efficiency, and estimate the advantage of this consolidation. Now, if you are able by this consolidation to do additional work which nominally requires clerical service, without the addition of clerks or statisticians or statutory employees, that would indicate that some saving in the statutory roll and in the amount of work that is done, would be represented by this consolidation, even though it does not show any actual decrease in money. That is what I am trying to get at.

Mr. ESTABROOK. That is the case with us. We are taking care of our needs quite largely for additional clerks, and by this consolidation making people available in combining our administrative offices. We gain additional clerks in combining the files and the offices of the chief clerks, and those regular parts of the establishment. Those people are not dropped, but they are assigned to other work.

Mr. TAYLOR. As nearly as we were able to figure the result of the consolidation of the Bureau of Markets and Crop Estimates, $25,060 that had been expended in connection with the overhead of the two organizations was saved from the overhead and transferred to the scientific work—that is to the clerical help in the scientific work of the combined bureau. So far as we are able to estimate the results of the final consolidation of the Bureau of Farm Management and Farm Economics with these other bureaus, the total saving will be approximately $30,960. We have listed here the specific positions in the statutory roll that will be made available for the other work.

Mr. ANDERSON. What do you mean when you say "other work?"

Mr. TAYLOR. I mean for the scientific work as distinguished from the overhead administration of the bureau.

Mr. ANDERSON. That is to say, what you gain in your administrative appropriation by the consolidation, you expect to spend for men who do work of the more scientific character. Am I right about that?

Mr. TAYLOR. Yes. That is, the clerks and stenographers who will be saved from the general administration will be used in carrying forward the research and service and regulatory work of the bureau as it expands.

Mr. BUCHANAN. Let me see if I catch that. What you save by the consolidation, you devote that for additional clerical help for the scientific part of it; not for scientific men but for clerical help or administrative work for the scientific branch?

Mr. TAYLOR. Yes, sir; and some few positions are dropped out of the roll entirely. That is, the position of Chief of the Office of Farm Management, which is a statutory position, is simply dropped out.

Mr. BUCHANAN. Does that result in the expenditure of any less money?

Mr. TAYLOR. The overhead operation in the general administration of the three bureaus combined, as we believe, will show a saving; the saving will be approximately $60,000.

Mr. BUCHANAN. You do not catch the question. You said some few positions were dropped out.

Mr. TAYLOR. Yes; for instance, there was the chief of the office of Farm Management, and there was the chief of the Bureau of Crop Estimates, and there was the chief of the Bureau of Markets.

Mr. BUCHANAN. Will the dropping of these positions result in the expenditure by the department of any less money, or will you use the amount that would have gone to pay the salaries of these positions, in more work?

Mr. TAYLOR. In more work.

Mr. ANDERSON. One other question. The usual statement is made on page 214, where there are transfers to the division of publications. "In each case the rolls have been reduced by the amount of salaries involved." I have not gone over all these items carefully, but two or three cases have caught my eye in which apparently that was not the case. It may be that some explanation will clear that up. For instance, on page 228 of the estimates you have provided a separate item for work which is laready being done in the bureau, apparently, of $65,000. This statement on page 228 reads as follows:

> The language of this paragraph is new, but it covers work now authorized by law under the appropriation for farm management and farm economics. There is no change in the amount now allotted for this purpose from the lump fund appropriation, but as two employees have been transferred to the statutory roll, an actual increase of $2,160 will result.

That is one case. The same thing, apparently, is true under the item on page 229, "for the investigation of country life and community organizations," etc.

The same thing apparently is true in regard to the item on page 231, "for collecting, publishing, and distributing, by telegraph, mail, or otherwise, timely information on the market supply and demand," etc.

It may be that the statement on page 214, properly construed, refers only to transfers which were made to the Division of Publications. I have not checked that up.

Miss CLARK. The transfers to the Division of Publications reduce our statutory roll. There are other transfers, however, from our lump-sum rolls to the statutory roll. We say that these result in an actual increase of the lump sum, because we take those clerks off the lump sum and put them on the statutory roll. But we actually reduce our total by the transfers to the Division of Publications. We take off $25,960 for the clerks that we transfer to the Bureau of Publications, and that comes out of the total amount for this bureau.

Mr. ANDERSON. As a result of those transfers to the Bureau of Publications, the statutory rolls have been reduced?

Miss CLARK. Yes, sir.

Mr. ANDERSON. Were they statutory employees?

Miss CLARK. They were on statutory, and they are put over in the Bureau of Publications on statutory, so that that cuts our statutory roll by $25,960.

Mr. ANDERSON. Were those employees all statutory?

Miss **Clark**. Yes, sir; all statutory; and they will remain on statutory in Publications.

Mr. **Anderson**. All right; we have got the idea, I think. We will take up next the general item on page 215. There is no change there except the change in title.

GENERAL ADMINISTRATIVE EXPENSES.

The next item is on page 216:

> For general administrative expenses in connection with the lines of investigation, experiment, and demonstartion conducted in the Bureau of Agricultural Economics.

Mr. **Taylor**. The appropriation is for administrative expenses of the bureau, including the salary of the associate chief and assistant chief, and the chief statistician and specialists who are employed temporarily from time to time on definite problems. Recently those have been problems in connection with the plans of reorganization.

This item does not, of course, cover all the expenses involved in general operations of the bureau. Much of the expense of the general operation of the bureau is covered by the clerks and other employees on the statutory roll. For instance, this general total might include the handling of files for the whole bureau, the mail, the administrative accounting office, appointments, and items of that kind.

Mr. **Anderson**. As I understand it, this item covers the administrative employees rather than the clerical force.

Mr. **Taylor**. Yes; the administrative employees that are paid out of the lump sum.

INVESTIGATION OF IMPROVED METHOD OF FARM MANAGEMENT, ETC.

The next item is that for work in farm management and farm practice, for which $65,267 is asked in the lump sum. I would like to have Mr. Forster, who is acting chief of the Office of Farm Management and Farm Economics, make a statement as to what is being done and what it is proposed to do.

Mr. **Anderson**. Before you come to that, I would like to ask you whether or not there is any advantage in separating this farm management proposition from the cost of production studies?

Mr. **Taylor**. My answer to that question is that so far as the utilization of cost of production studies is concerned, the greatest and most important use is the application of the cost studies to the problems of more efficient farm management and farm organization. From the standpoint of the technical problem of doing the accounting work well, there is some advantage in associating the technical employees working on the cost of production and the cost of distribution, and, as from the standpoint of the difficult problems they meet in carrying out their work, this closer association is helpful.

It is also important, however, that the work in the farm management and farm practice be carried on in the closest conjunction with the cost of production work.

Mr. **Anderson**. What I am getting at is this: The separation of these items seems to imply—perhaps it does not, but it seems to imply—a separation of the organization so engaged in the two activities. Now, it may be that the proposition is so organized that there is no actual separation of the organization in practice, as there is a separation of the funds in the bill, and what was in my mind was whether a separation of the funds in this way would in any way detract from the possibility of combining the organizations.

Mr. TAYLOR. That question may well be raised, the question of whether or not the funds will be as flexible if set apart in separate items by the Congress, as if all these items which formerly made up the lump sum of the Office of Farm Management and Farm Economics were appropriated in the one sum of $325,000, which they added up to last year.

As the one in charge of the general administration of those funds, I believe it could be handled more efficiently if the total sum of $325,000 were appropriated as one lump sum for the purpose of covering all of these items that are designated here, just as the marketing and distribution fund is appropriated as one fund and used in the various commodity divisions. So far as the matter of administration is concerned, aside from this question of flexibility, the administration will be carried forward the same, and in the closest possible conjunction so long as I have to do with it.

Mr. ANDERSON. There is one question I wanted to ask you with regard to the preceding item, which has reference particularly to the $6,273 allotted for administrative purposes under general expenses of the Office of Farm Management and Farm Economics.

Mr. TAYLOR. It is transferred to the general expenses. That included the salary of the acting chief and of one clerk, or his assistant.

Mr. ANDERSON. Is that subject to the salary limitation of the law?

Mr. TAYLOR. Yes; the salary was $4,500. The two together made the sum. Now, will you hear Mr. Forster?

STATEMENT OF MR. G. W. FORSTER.

Mr. FORSTER. The work in farm management and farm organization necessarily falls into two divisions. First, the study of farm organization and farm practice, which is conducted for the purpose of determining the factors involved in the successful operation of the farm.

Mr. ANDERSON. Let me ask you a question there, to get this straight in my own mind. When you speak of farm organization, do you mean the organization of farm units rather than the organization of farmers?

Mr. FORSTER. Yes, sir; the organization of the individual farm for production.

Such factors as the size of the farm and the amount and quality of the capital employed, the quality and quantity of production, and the nature of the managerial ability, are necessarily involved in studies of this kind. These studies are carried on by the farm management survey method which is essentially an accounting method. Farmers are visited in certain regions of the United States, and a complete schedule is filled out for each farmer visited which gives the profits obtained from his farming, and throws light on the factors which I have already mentioned.

At the present time we are conducting studies on 135 farms in Washington County, Ohio; we are in the fifth year of study in a representative fruit area and general farming area in Shenandoah and Frederick Counties, Va. (all fruit farming); the fifth year in a representative truck area of Hillsboro County, Fla., covering 127 farms; the fifth year in a representative citrous fruit area in Florida covering 154 farms; repetition of survey in cut-over land area in western Washington, comprising 250 farms, with the idea of determining the settlers' progress and a general record of farm profits.

Mr. **Anderson**. Are these studies carried on in any of these places in cooperation with local people?

Mr. **Forster**. Yes; practically all our studies are carried on in cooperation with the State authorities on a fifty-fifty basis.

Mr. **Anderson**. Is that a money basis or a man basis?

Mr. **Forster**. That is a money basis—that is, money or its equivalent. We usually pay the salaries of the men and they pay the traveling expenses and clerk hire, or whatever may be necessary to work up the records in the field.

In the cotton belt, we are continuing studies in South Carolina, Georgia, and Mississippi.

We are continuing our studies of wheat in Washington, Idaho, and Oregon, covering 400 farms.

This year we have started a study in a dairy region of Wisconsin, covering 277 farms; and we are continuing our farm power studies in cooperation with the Bureau of Public Roads for the purpose of determining the cost of horse and tractor power.

Mr. **Anderson**. Just how does this work you are doing under farm management differentiate itself from the cost of production studies?

Mr. **Forster**. The schedule which we have for farm-management and farm-organization studies does not permit—it is not in detail enough to permit—the study of the cost of producing any one of the many products which the farmers grow.

Mr. **Anderson**. You take the bookkeeping as it is, or as you are able to improve it, and arrive at the profits?

Mr. **Forster**. The schedule provides for the taking of the inventory at the beginning and end of the year; current expenses (we get these as closely as possible from such records as he keeps), and also the sale and purchase of farm products; the size of his farm; the amount of capital which is employed, yield and acreage of crops, etc.; and by a very carefully worked out schedule we are able to arrive at the profits made in any one year; but it does not go into detail as to the items of producing the individual crops or live-stock products.

Mr. **Anderson**. This is an effort to get at the profits of the farm unit as a plant?

Mr. **Forster**. Yes; and we are able to suggest methods whereby the farmer can improve his farm organization by analyzing the records according to size of business, crop yields, returns from live stock, and efficiency in the use of labor. The farmer can, by comparing his farm business thus analyzed with that of the average for the region and with the average for the better farms, determine the weak and strong points of his organization.

Mr. **Anderson**. Is the basis upon which this work proceeds an effort to arrive at the income which the farmer receives for labor, or income which he receives for allowances for labor as a return on the investment, or both?

Mr. **Forster.** We can, from these records, get both. In order to get his labor income we have to assume a certain rate of interest on the capital employed.

Mr. **Anderson.** You estimate a certain rate of interest on the capital employed, so that the final result would appear for labor and management, I take it?

Mr. **Forster.** Yes, what is called the labor income; but we also have the net income from the farm.

Mr. **Anderson.** Have you made any studies based on, let us say, a fairly adequate wage for the farmer, with a view to determining what his net income is from the farm after paying himself a reasonable salary for his labor?

Mr. **Forster.** Yes.

Mr. **Anderson.** In other words, there are two ways of getting at this thing, either in the farm-labor income or the capital income? I am wondering which you are doing, or if you are doing both?

Mr. **Forster.** We are doing both, and our results are capable of being worked out in either way.

Mr. **Anderson.** Could you give us some idea of what these results show? I do not want you to go into detail, but give us what they show as to the labor income and the capital income—just take some typical area.

Mr. **Taylor.** On that point, Mr. Chairman, I might state that the surveys that have been made show the labor income before the war and during the war period. The labor income in dollars grows very appreciably, although in purchasing power it increases very little, and then the labor income since the war is almost lower than before the war, and it has about half the purchasing power it had before the war.

Mr. **Anderson.** The reason I asked that question is this. I know that the studies that have been made on the basis of total production of general products show exactly the condition that you describe, but I was trying to find out whether these intensive studies, made in the way that you have suggested, confirmed, in a general way, the figures that were demonstrated by the general study of the question.

Mr. **Forster.** Here is a cotton area (Sumter County, Ga.). The farm income is expressed in index numbers. In 1913 the net farm income expressed as 100 grows to 223 in 1918, and in 1920 drops to 92, and in 1921 it is estimated to have dropped to 84. But the purchasing power of the farm income dropped, in that same area, from 100 in 1913 to 55. I have here similar results for other areas.

Mr. **Anderson.** Is that for 1921?

Mr. **Forster.** Yes.

Mr. **Anderson.** What was it for, 1920?

Mr. **Forster.** Thirty-eight. This was for cotton.

Mr. **Lee.** It happens that that is the only county around in that little neighborhood that made a successful crop. It is very remarkable.

Mr. **Forster.** In North Carolina similar results were obtained, and in 1921 the prices were somewhat different, which affected the income for that year.

Mr. **Anderson.** Now, will you give us the reduction in labor income, if you have it there?

Mr. **Forster**. I do not have the labor income data here, Mr. Chairman, but in most cases it is a minus quantity. The farmer received less than current wages.

Mr. **Anderson**. In arriving at that labor income, what rate of interest did you allow on the capital?

Mr. **Forster**. That varied with the section. In the South it was 7 per cent, and in some of the dairy regions it was 5 per cent. We usually use the actual rate paid on farm mortgages in the different regions.

Mr. **Anderson**. Did you figure that that involved the rate of interest on all capital production?

Mr. **Forster**. Yes, it involved the capital used in production.

Mr. **Anderson**. I wish you would put into the record some general figures on the general result of the labor income.

Mr. **Forster**. We can do that. We have it for about eight representative areas in the United States.

Mr. **Anderson**. I do not want it in detail. You can give us general averages for these different areas, if you have them.

Mr. **Forster**. Yes, we have that.

Mr. **Anderson**. All right.

Average farm income, labor income, per cent return on capital, and purchasing power of farm incomes in 8 representative areas of the United States.

Areas.	Number of farms.	Farm income.[1]				Purchasing power of farm income.[2]				Index of purchasing power of farm income.				Labor income.[3]				Per cent return on capital.[4]			
		1913	1918	1920	1921	1913	1918	1920	1921	1913	1918	1920	1921	1913	1918	1920	1921	1913	1918	1920	1921
Cotton:																					
Sumter County, Ga.	268	$1,665	$3,711	$1,534	$1,401	$1,665	$1,893	$631	$916	100	114	38	55	$474	$1,813	− $364	− $497	7.0	11.3	3.3	2.8
Catawba County, N. C. (1912)	297	413	985	383	224	413	503	158	146	100	124	38	35	87	542	− 60	− 219	2.3	6.4	− .4	−2.2
Dairy:																					
Hillsborough County, N. H.	17	933	1,391	1,134	1,015	933	710	467	663	100	76	50	71	613	952	695	576	4.6	7.1	4.2	2.8
Dane County, Wis.	30	1,180	2,197	1,482	793	1,180	1,121	610	518	100	96	51	44	293	1,223	508	− 181	4.4	([5])	([5])	([5])
Hogs and cattle:																					
Clinton County, Ind.	100	1,503	2,978	1,222	555	1,503	1,519	503	363	100	102	37	24	256	1,421	− 335	−1,002	4.7	7.9	2.2	.1
Tama County, Iowa	[6] 965	2,607	4,570	1,637	570	2,607	2,331	674	373	100	89	26	14	306	1,537	−1,396	−2,463	4.8	5.6	.8	−1.0
General live stock: Washington County, Ohio	25	421	719	445	157	421	367	183	103	100	87	43	24	110	333	31	− 257	2.2	4.8	.9	−2.6
Wheat: Palouse (Washington and Idaho, 1914)	246	2,357	[7] 4,616	1,709	593	2,357	2,177	703	388	100	91	30	16	709	[7] 1,826	−1,080	−2,197	7.0	7.7	1.4	−.96

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[1] Farm income is the difference between receipts and expenses; the receipts consist of cash received for products, miscellaneous receipts, and the value of increased inventory the expenses consist of cash payments, the value of services rendered by members of the farm family other than the operator himself, depreciation on buildings and equipment, and decrease, if any, in the money value of the inventory; the farmer's own labor and interest on the value of the farm property are not included in the expenses; farm income is a fund for current family use, which can not be overdrawn without impairing the capital employed; due to interest on indebtedness and to the fact that a part of the farm income is often in goods rather than in cash and that the current financial needs of the business must be paid out of the farm income, it does not represent a sum altogether available for living expenses.

[2] The purchasing power was determined by dividing the figure for the farm income by the index number for wholesale prices established by the Department of Labor; the index numbers employed are as follows: 1913, 100; 1918, 196; 1919, 212; 1920, 243; 1921, 153.

[3] Labor income is a phrase used to designate the residuum for the farmer's labor and managerial ability after deducting from the farm income interest on the value of the total investment; the interest rate employed has been 5 per cent, but in the Georgia study 7 per cent and in the Palouse area 6 per cent were used.

[4] Per cent return on capital is the rate of interest returned on the value of the farm capital after deducting from the farm income the value of the farmer's labor.

[5] Data not available.

[6] 211 farms for 1918–1921.

[7] 1919.

NOTE.—The 1912, 1913, 1918, and 1919 figures for all regions are from actual business analysis records; the 1920 figures, with the exception of Washington County, Ohio, and the 1921 figures, have been computed from the data for 1918 or 1919.

INVESTIGATING COST OF PRODUCING FARM PRODUCTS, ETC.

Mr. **Forster**. The second division of the work is cost of production, and investigations in this——

Mr. **Taylor**. That is the first half of the next division.

Mr. **Anderson**. You are taking up, then, the next item on page 218?

Mr. **Taylor**. Yes.

Mr. **Forster**. The work in cost of production is divided into two groups, according to the method used. First, we have the enterprise cost studies. In these studies some specific crop, live stock or livestock product, is selected and its cost determined in detail, together with the complete business record of the farm.

Mr. **Anderson**. Is this a different set of farms from the ones you were taking before?

Mr. **Forster**. Yes; these are entirely different sets of farms.

Mr. **Anderson**. Would there not be some economy in using the same set of farms for both subjects?

Mr. **Forster**. In order to get a sufficiently wide distribution of our studies, the cost of the work must be considered, and we can not cover every farm in the same year.

Mr. **Taylor**. I wish to say, Mr. Chairman, that we are moving in that direction. To the farm survey work looking toward farm labor income and return on investment we are securing additional information on enterprise costs and for the last two years and a half all the enterprise cost studies have carried with them the general farm survey which would enable us to make a statement of labor income and make the farm management analysis that is made in the farm survey study; so that these two are verging together and gradually becoming one. In fact, we are practically at the point of consolidating the force into one unit.

Mr. **Anderson**. Let me ask you foolish question No. 9,000. In the progress of these cost studies in the farm management work, has there been any improvement in the keeping of the records by the farmers themselves, and have they accepted the results of these studies as indicative of better farm management practices?

Mr. **Forster**. The extension workers report that that is the case. We have very little opportunity to follow up our investigation except through extension workers, and they claim that the results that we publish are being used successfully. The farmers are taking up and keeping more detailed records.

Mr. **Anderson**. You mean outside of these particular farms that you are working on?

Mr. **Forster**. Yes; and on a good many of these farms they continue to keep records after we cease to visit them.

Mr. **Pugsley**. Mr. Chairman, you would be interested in knowing how these results are gotten to the farmers, to induce them to keep better records?

Mr. **Anderson**. Yes; I think so.

Mr. **Pugsley**. Meetings are arranged by the county agents with the people who make the investigations or are familiar with the investigations, to give the results, with the idea of inducing the farmers to keep books and keep track of their operations as the result. These meetings are quite largely attended, and in very many instances they result in change of farm practice.

Mr. ANDERSON. As I understand it, these studies have particularly to do with business management?

Mr. PUGSLEY. Yes.

Mr. ANDERSON. And I suppose they have an incidental bearing upon the crop management. But I suppose what they are really designed to do is to make a better business man out of the farmer. Am I correct about that?

Mr. TAYLOR. Yes, sir; that is the first purpose. Of course, as a better business man, he chooses crops more wisely, combines crops more wisely, and in that way it comes in close touch with the question of crop rotation.

Mr. FORSTER. Adjusting the size and shape of his fields, introducing more efficient methods, etc.

Dr. BALL. It gives him the information on which he can become a better business man.

Mr. ANDERSON. Do the farmers feel that this record keeping is a good deal of a burden?

Mr. FORSTER. The way in which we handle it is to help the farmer keep his own records. Where the complete records are kept on the farm, it is considerable labor, but when the farmer sees the use of this particular thing he gradually takes it up. The time required for keeping complete cost records is not much more than 10 or 15 minutes per day, if the farmer is so inclined to do it; and if we get him up to the point where he sees results and sees the benefit of keeping the records there is no reason why the intelligent, ambitious farmer should not keep farm business records.

Mr. BUCHANAN. What does this record consist of that will take the farmer 15 minutes a day?

Mr. FORSTER. Complete record of all the farm transactions and the distribution of the labor required for different crops and live stock production.

Mr. BUCHANAN. It is a daily record of all expenses?

Mr. FORSTER. Yes; and where the labor was expended by himself or his hired men. We have forms worked out for that purpose.

Mr. BUCHANAN. With the result to determine the cost of the products raised?

Mr. FORSTER. Yes; of all products raised, if he so desires.

Mr. WASON. And you say he can do that in 15 minutes a day?

Mr. FORSTER. He can put down the original material in from 5 minutes to 15 minutes a day, depending on the complexity of his business.

Mr. WASON. If he makes a footing once a month or once a quarter, how much will it average him for his daily labor for that quarter, and what would be the size of his farm that you are talking about?

Mr. FORSTER. I do not know that I can answer that question exactly, but the time necessary for footing up any particular crop is not very large, and the adding of the subtotals does not take long.

Mr. WASON. Now, I assume that the farmer you have been observing raises more than one crop.

Mr. FORSTER. Yes; and the time allotted for that I should say would not be more than two or three hours at the end of each month, to balance his records and find out where he was at any particular time in the month.

Mr. Taylor. Explain about the 400 farms where detailed records are being kept, and the actual work that is being carried forward.

Mr. Forster. For detailed costs we have constructed certain uniform records which we use in our studies. The farmer is provided with a labor record book which he carries with him at all times. He has it in his pocket, or he leaves it in the house if he so desires when it is a slack time of the year. When he starts out to do a certain piece of work on a field he simply jots down the time that he starts. He sets down the time when he starts plowing on field A, for example, and he notes the hour when he stops, and that method is used for all the operations of the farm. The farmers who are cooperating with us send the original records to the State experiment stations and they are there summarized for them. That is in the work we are carrying on directly for the farmer; but you had reference to the farmer keeping his own accounts, did you not?

Mr. Wason. Yes; sure.

Mr. Forster. And carrying them right through. That takes, of course, a little longer, to summarize them at the end of the month or the year; but the farmer can do that himself.

Mr. Wason. What is the average activity of these 400 farms?

Mr. Forster. I will come to that in a minute and give you a list of the total activities.

Coming back to the matter of enterprise cost studies, I want to give you an idea of the field covered. We are determining the cost of fattening 680 head of beef cattle in Nebraska, 976 in Iowa, 1,256 in Illinois, 736 in Indiana, and 1,048 in Missouri. All these studies include not only the detailed results on the cost of fattening cattle, but also the complete business analysis of the farm, and the latter records cover 300 farms having 14,982 head of cattle.

We are studying also 45 droves of cattle in Chase County, Kans.

Arrangements are now being made for a study to determine the cost of producing beef on 20 ranches in the State of Colorado.

We are studying the cost of producing pork on 35 farms in Henry County, Iowa, 60 farms in Humboldt County, Iowa, 60 farms in the central portion of Indiana, and 35 farms in Warren County, Ill.

The cost of producing milk is being determined on 60 farms in Walworth County, Wis.

This will give you an idea of the field covered in the enterprise cost studies.

Mr. Wason. Have you made any study of the cost of producing beef in New England?

Mr. Forster. No, sir.

Mr. Wason. Of course that is not a large beef raising country.

Mr. Forster. No. We have made no studies; but perhaps the Federal Trade Commission has covered some of those areas, although I do not believe there has been any work done in that section.

The second division is that of complete cost studies. These studies consist of a detailed statement of costs of and profit derived from all farm enterprises and are conducted in the following regions.

Mr. Anderson. May I ask one question here? In estimating farm income, is any allowance made for increase in the value of land?

Mr. Forster. In conducting the investigation, we attempt to avoid anything which might be called paper profit. There is a normal increase in the selling value of land that might come into the inventory at the end of the year, but anything which suggests a paper profit is left out in our system of accounts. That holds true also regarding cattle and anything that is inventoried at the end of the year which would suggest a paper profit to the farmer.

In New Jersey we have 20 farms on which detailed cost records are conducted, covering especially potatoes, tomatoes, and dairy products; in New York 50 farms, including dairy, fruit, and general farming; in Connecticut 20 farms, mostly general farming; in Montana 25 farms, covering grain, live stock, and dairy, and some on irrigated farms; in Minnesota 50 farms, 25 of which are devoted to dairy and 25 to grain, hogs, and beef; in Kansas, in McPherson and Jackson Counties, 25 farms, mostly grain, with some live stock; in Ohio 20 dairy farms and 20 general farms; in Colorado 25 farms in the sugar-beet area, which we are just starting; North Dakota is now conducting complete costs on about 200 farms, and we are cooperating with that State in conducting the work.

Mr. ANDERSON. Is that generally true with reference to the intensive cost production studies?

Mr. FORSTER. Yes; and of course the farming in that region is not so complex as in many other regions.

Mr. ANDERSON. I got the general impression from reading that you did a considerable amount of work last year, and I was wondering how you accomplished it unless there were funds available for that purpose.

Mr. FORSTER. The States are cooperating on a 50-50 basis in these studies, and in some cases all we are contributing is simply the forms used and some advice. This is true of South Dakota, where the State is spending $15,000 in cost work.

In Wisconsin we have 25 dairy farms on which complete cost work is being carried on, and in Kentucky 20 farms in the burley and black tobacco regions.

That covers the work now being conducted in cost of production and farm organization.

Mr. BUCHANAN. Is your division qualified now to give the cost of production of these various products for any year; the average cost of producing tobacco or butter or milk or cotton or wheat or any of these products that you have had these experimental farms on?

Mr. FORSTER. Yes, indeed; we can give you the cost of producing most of the important agricultural products in the United States.

Mr. BUCHANAN. The actual cost of production?

Mr. FORSTER. The actual cost of production.

Mr. BUCHANAN. Which includes a cerain per cent upon the capital invested?

Mr. FORSTER. That item is separate in the itemized cost of production.

Mr. BUCHANAN. Does it include the value of the farmer's own labor?

Mr. FORSTER. Yes; we have a considerable amount of data on that subject now available for use.

Mr. BUCHANAN. Have you at hand what it costs to produce cotton?

Mr. FORSTER. I can give you very shortly an idea of the trend in the cost of production of all the important products in the United States, if you wish to have them.

Mr. TAYLOR. We can get that and put it in the record.

Mr. FORSTER. If that will be satisfactory, I can do that.

Production costs of staple farm products.

Product.	No. of records.	Production cost investigations from which basic factors of cost were determined.					Trend of production costs computed from basic factors and expressed in index numbers, 1913=100.			
		State.	County.	Year.	Yield.	Average acre cost (net).	1913[4]	1918	1920	1921
Cotton	89	South Carolina	Anderson	1918	248 pounds	$65.08	100 ($0.15)	170	191	126
Do	75	Texas	Ellis	1918	176 pounds	36.23	100 ($0.13)	155	191	151
Wheat	284	Kansas, Missouri, Nebraska.	9 counties	1919	14.9 bushels	27.80	100 ($1.04)	168	209	171
Do	197	North Dakota, South Dakota, Minnesota.	5 counties	1919	8.4 bushels	22.40	100 ($0.99)	173	225	166
Corn	[1] 46	Illinois	Cass, Minard, Sangamon	1917	46 bushels	23.02	100 ($0.36)	150	161	130
Oats	[1] 38	Illinois	4 counties	1917	35.3 bushels	14.50	100 ($0.32)	141	166	142
Sugar beets	195	Colorado	Greeley	1917	15.57 tons	86.95	100 ($3.93)	159	173	118
Do	134	Michigan	Tuscola	1915	9.72 tons	47.65	100 ($4.76)	155	188	134
Potatoes	51	Minnesota	Clay	1919	103.1 bushels	78.09	100 ($0.38)	169	183	137
Do	50	New York	Steuben	1919	141 bushels	96.14	100 ($0.43)	142	229	123
Hay (clover)	[1] 4	Illinois	4 counties	1917	1.3 tons	13.90	100 ($8.55)	138	170	147
Hay (mixed)	[1] 23	New York	Several counties	1913	1.4 tons	14.21	100 ($10.15)	148	192	136
Barley	33	Colorado	Greeley	1917	53.9 bushels	40.55	100 ($0.56)	138	155	131
Alfalfa	36	do	do	1917	3.43 tons	35.37	100 ($7.70)	140	157	130
Beans	26	New York	Genesee	1913	10.9 bushels	40.65	100 ($3.73)	170	177	135
Do	23	Michigan	Tuscola	1913	10.5 bushels	29.34	100 ($2.79)	165	179	128
Apples	218	New York	5 lake counties	1915	84 barrels	[1] 18.78	100 ($1.42)	168	218	158
Tobacco	[1] 81	Kentucky	Fayette	[2] 1919	1,141 pounds	289.10	100 ($0.13)	176	223	167
Do	[1] 70		Christian	[3] 1919	825 pounds	141.75	100 ($0.08)	173	205	150
Do				[2] 1920	908 pounds	295.73				
Do				[3] 1920	855 pounds	126.87				
Do	[1] 19	Wisconsin	Dane	1913	1,300 pounds	61.00	100 ($0.05)	158	196	138
Kafir	19	Kansas	Cowley, Greenwood	1917	23.2 bushels	33.72	100 ($1.04)	158	154	116
Tomatoes	[1] 280	New Jersey	Several counties	1918	6.23 tons	119.26	100 ($11.96)	160	180	138
Onions	[1] 16	do	Cumberland	1920	180 hampers	291.97	100 ($0.88)	162	185	140
Corn-fed cattle	500	Nebraska	Burt	1913–1921		[5] 8.75	100 ($8.75)	168	156	118
Hogs	58	Missouri	Lafayette	1913–1921		[5] 7.22	100 ($7.22)	189	106	70

[1] Detailed cost accounting and route records.

[2] Dark tobacco.

[3] Burley tobacco.

[4] The 1913 unit cost was computed by using the average yield for the year of the investigation except in the case of wheat, where a 10-year average was used.

[5] Cost per hundredweight, 1913.

Mr. **Buchanan**. Yes.

Mr. **Lee**. I noticed that in Georgia you took Sumter County, and it happens that the best crop in 100 miles there was made in Sumter County. That was an exceptional county. A few counties above that, instead of a yield of 179,000 bales, they made 299 bales. If you had had your experiments running in that county, it would have been quite different, would it not?

Mr. **Forster**. We have distributed our studies over the South as best we can. Last year we had over 10 different areas in which we studied the cost of producing cotton and the cost of farming in the cotton belt area.

Mr. **Lee**. I just happen to know that that was an exceptional item.

Mr. **Buchanan**. Will you furnish the cost of cattle also?

Mr. **Forster**. Yes.

Mr. **Buchanan**. That is very valuable information.

Saturday, February 11, 1922.

COST OF MARKETING.

Mr. **Taylor**. We would like to present the facts with regard to what we are doing on the cost of marketing; and, as Dr. Erdman has that work in hand, I will ask him to make a brief statement.

Mr. **Erdman**. The lines of work that we have thus far undertaken are studies of the cost of marketing live stock at country points, costs in a small packing plant, costs or retailing meats, costs of milk marketing, costs of potato marketing, and costs of marketing boxed apples.

Wherever possible work is done in cooperation with State agencies, generally the State agricultural experiment station. In a few cases this is done by employing men in the States on a joint basis, and in others it is done by arranging to have our men and the State's men work in cooperation, the data jointly collected to be available to both parties. This is proving of advantage in making State and Federal work more uniform, in giving each party the benefit of such experience or skill as the other may have, and in increasing the amount of work that can be done.

The value of such studies lies in the fact that they will first give us light upon a much-discussed and complex subject, thus making possible more intelligent analysis and more constructive thinking.

Second, they will lead toward greater efficiency, much as motion studies of labor operations have done.

In order to secure the best results, the cooperation of the trade is needed. Therefore the aim is to make these cost studies from the point of view of being helpful to the trade by helping it study its own business more effectively, and to present to the public a fair picture of what happens at each step in the movement of farm products from producer to consumer.

The cost of marketing live stock at country points is being studied in the corn-belt States. In this study the cost of marketing division is cooperating with the division of live stock, meats, and wool, and also with the division of cooperative relations, so as to make this not only a study of costs, but of methods of marketing as well, since a better analysis can thus be made. This study breaks up into three distinct lines:

(a) Costs of marketing through cooperative shipping associations. It is planned that detailed cost data will be collected from at least 200 cooperative associations and general data from as many more.

(b) Costs of marketing through local buyers. Here it is found that records are so meager that it is difficult to secure data on costs except in relatively few instances.

Mr. **Anderson.** May I ask how far those studies go? Do they take these costs through to the packer, or is this study devoted to costs at the local market?

Mr. **Erdman.** The marketing costs at the local markets, and what we get from the account sales. The latter include the freight costs, which divide up, as between specific freight charges and charges for feeding enroute, and the terminal charges, as the costs to the producer.

Mr. **Anderson.** Are those charges separate for feed?

Mr. **Erdman.** Yes, sir; from the account sales which the cooperatives have on file they are separated.

Some very good data have been obtained, and in addition, about 30 local buyers in Indiana, Kentucky, Illinois, Iowa, and Kansas are now keeping records of all their live-stock transactions on simple forms devised by this division. These will be available to us.

Mr. **Anderson.** How long a period will these cost studies cover—current costs?

Mr. **Erdman.** In the main, they cover 1921, and, where available, they are for 1920.

Mr. **Anderson.** They do not go back?

Mr. **Erdman.** Except in some few instances we do not go back.

Mr. **Anderson.** Of course, it is very difficult to get data over a period of years past.

Mr. **Erdman.** It is very difficult.

Mr. **Anderson.** Is it more difficult to get data over a period of years past than it is to get current data.

Mr. **Erdman.** Yes.

Costs of marketing where producers ship their own stock independently are being studied in each area. Arrangements have also been made to have the men who study the costs of producing feeds get data on costs of marketing where the farmer ships his own stock.

Mr. **Anderson.** I take it that these studies will have to go along for some time before anything definite will come from them.

Mr. **Taylor.** We have just started on this work this year.

Mr. **Erdman.** We expect to have the data on costs of marketing live stock compiled by July 1.

A study was made of the costs of retailing meats in various parts of the country in 1919, with supplementary data for 1913, 1920, and 1921.

The total margin in 1919 of the dealers having mainly a family trade was 18.86 per cent of sales, of which 16.59 was expenses, including a normal wage and interest on investment, and 2.29 per cent of sales was net profit.

Mr. **Anderson.** What year was this?

Mr. **Erdman.** This was the year 1919.

Mr. ANDERSON. 1919?

Mr. ERDMAN. Yes, sir.

Mr. ANDERSON. Do I understand you to say that the margin of the retail costs represented 18 per cent of the sales price?

Mr. ERDMAN. Yes, sir; 18.86 per cent those for stores having a family trade.

Mr. ANDERSON. That looks awfully low to me. What was it in 1921?

Mr. ERDMAN. In 1921 it was——

Mr. TAYLOR. It was 35 per cent of the cost of goods.

Mr. ANDERSON. It seems to me it should be.

Mr. TAYLOR. As prices came down the wholesale prices came down very much more rapidly than retail prices, and the margin increased.

Mr. ANDERSON. That is typical of the old prices in all the trades, but I was rather surprised at a figure of 18 per cent for 1919.

Mr. ERDMAN. Of the total operating expenses 61.86 per cent was for wages and salaries. The next largest item was rent, with 8.03 per cent. The average wage of meat cutters per hour in 1919 was 52.9 cents as compared with 32.3 cents in 1913, 60.87 cents in July of 1920, and 60.78 cents in July of 1921. In other words, taking 1913 as 100, the rate for 1919 was 164, for 1920 188.6, and for 1921, 188.4.

Mr. ANDERSON. I think that is rather typical, too. It is clear that wages all along the line have not come down proportionately with the commodity prices.

Mr. ERDMAN. The costs of doing business in "carry" stores was about 2 per cent of sales less than in delivery stores. Delivery costs were 2.62 per cent of all sales made by the delivery stores, or 6.72 per cent of sales of meats which they actually delivered.

Mr. ANDERSON. Were any of those figures taken on the basis of the wholesale price instead of on the basis of the retail price?

Mr. ERDMAN. Yes, sir; if I can put my fingers on them. No; I do not believe I have them here.

Mr. TAYLOR. Here is a report on the retail meat trade that has just been prepared.

Mr. ERDMAN. In cooperation with the Wisconsin Department of Markets, costs of retailing meats are being studied in four or five Wisconsin cities.

On page 11 of that report you will find a tabulation of the costs in various stores.

Mr. ANDERSON. I notice one statement here that I think is wrong, and that is the use of the words "gross profits." There is no such thing.

Mr. ERDMAN. It should have been "gross margin."

Mr. ANDERSON. Yes. You find in every school book an example based on the theory that all of the margin between the cost price and the selling price is profit, and I think that that, coupled by things like this, is responsible for more misapprehension and misunderstanding of the profits of distributive agencies of the country than anything I know.

Mr. ERDMAN. It is probably adopted because it is a trade term.

Mr. ANDERSON. I know it is, but it is misleading.

Mr. ERDMAN. Undoubtedly.

A study of the costs of handling meats is being made in an eastern chain-store system and in a small packing plant through which this chain gets part of its meats, thus following the meat right through from producer to consumer. It is felt that a study of the problems in a small organization will lay the foundation for a clearer understanding of the complex problems which will arise in the comprehensive study being made.

In the study of the costs of marketing milk, usable data were secured from 28 middle western and 15 eastern companies—43 in all. Costs varied widely, even in given cities. In one city the total cost of putting a quart of milk at the consumer's door varied from 3 cents to 6.9 cents.

The average costs of operating city plants and of making the deliveries averaged 5.1 cents per quart in the Eastern and 5 cents in the mid-western cities. Transportation to the city was 1.6 cents in the East and 0.4 cent in the mid-West. Profits and returns to capital were 0.42 cent per quart in the East and 0.69 cent in the mid-West. Of the total expense about 50 per cent went to labor. The next largest item was materials and supplies, which was 15 per cent of all operating expenses.

As for the plans for another year, the study of costs of marketing live stock and meats will be continued next year. The study of costs of marketing grain will be commenced.

Mr. ANDERSON. Did you find in your marketing studies very many retailers who had any records upon which you could place any reliance?

Mr. ERDMAN. A relatively small number. The data were collected from 400 fairly complete cost accounts. They were found in 400 instances out of some 3,000 dealers of whom questions were asked.

Mr. ANDERSON. There is one thing I am satisfied about, and that is this kind of work has got to be done currently. An investigation this year which attempts to cover a period of years preceding is almost impossible. We just tried it, and I know something about it. Records disappear, and when you go back as far as three or four years, it is almost impossible to get data. If this material can be kept up currently for a few years, I think we can get some very valuable information.

Mr. BUCHANAN. Have you a statement of agricultural products for any one of the last two or three years, the cost production, and the intermediate cost between the producer and the ultimate consumer? For any one of the last two or three years have you determined the cost of production of agricultural products, then the intermediate cost from the producer to the ultimate consumer?

Mr. TAYLOR. We are getting that work organized now.

Mr. BUCHANAN. The cost to the middle man?

Mr. TAYLOR. The cost of producing pork and beef, the cost of marketing it, and carrying it clear through, is the project we started this year, and is the project reported on here. That is exactly the thing we are undertaking, but we have just gotten started in this work.

Mr. ANDERSON. You are attacking a job that everybody has fallen down on that has tried it.

Mr. TAYLOR. That is the kind of a job we like.

Mr. BUCHANAN. But the departments have not tried it before.

Mr. ANDERSON. I do not know of any study of that kind that has been attempted before. If it was, I do not think it was successful, and I do not know of any attempt that did not break down. It has been tried a good many times, and an immense amount of money has been spent, and if an attempt was made it has broken down.

Mr. **Anderson**. I do not want to be understood as saying that it is impossible, because as the phrase goes, any fellow that says it is impossible is usually interrupted by somebody doing it. It is a very difficult thing to do. I hope it can be done, because you will satisfy a good many people, and it would relieve a good many misapprehensions that now exist.

Mr. **Buchanan**. It would correct a good many abuses that are now indulged in.

Mr. **Anderson**. Is there anything further, Mr. Erdman?

Mr. **Erdman**. No sir.

INVESTIGATING MARKETING AND DISTRIBUTION OF FARM PRODUCTS, ETC.

Mr. **Anderson**. Page 219, acquiring useful information on the subject connected with marketing, etc.

Mr. **Taylor**. I will ask Mr. Tenny to present the work on marketing and distribution.

Mr. **Tenny**. This item, which is known as the marketing and distribution item, is the large appropriation made to the bureau for investigations in marketing. In our own records we have divided it into a number of well-defined subitems, and I think if we follow them we can get a better idea of the total appropriation and its use.

It might be well to note that there are some, not radical, but inportant changes made in the item. During the present year there is an item of $13,180, that is carried in the appropriation for farm management.

$248,800 is the old current marketing and distribution item. There is a separate appropriation of $38,400 for cotton standards and cotton testing work that is being brought into this marketing and distributing fund.

There is a special appropriation of $70,000 for State cooperation in marketing; $60,000 for grain standards studies, making a total of $430,380. This shows the present item $5,000 under that amount, but over against that we are transferring from this item $30,000, which is appropriated for studies in the preservation of fruits and vegetables in transportation, this being transferred to the plant industry appropriation, and also to public roads, and $6,000 which is being transferred to the statutory roll, which makes the item show an increase of $31,000.

We are asking that these separate appropriations be brought under this one fund, because the nature of the work is identical with the work being conducted under the appropriation, and, therefore, there are many advantages in having them consolidated.

Mr. **Anderson**. What is the difference between the work being done under this item and the marketing work under the preceding item?

Mr. **Tenny**. It is the same work extended to include the State cooperative work, the grain studies, and the cotton studies.

Mr. **Anderson**. What advanage is there in separating the marketing work under this item and the preceding item?

Mr. Tenny. I do not quite understand you.

Mr. Anderson. This is not a cost study.

Mr. Tenny. Not primarily; no. It is investigational work, and in a few instances certain sums have been set aside to assist in cost studies.

Mr. Erdman brought out in the cost of marketing studies that we are utilizing some eight or ten thousand dollars out of our State cooperation fund to conduct the cost of markering studies, but primarily this item covers standardization and methods of marketing.

Mr. Anderson. All right.

COOPERATIVE PURCHASING AND MARKETING.

Mr. Tenny. The first project is the cooperative purchasing and marketing project. We have an item of $14,000, which is all that is being spent for the cooperative marketing studies. This work has been reorganized to a certain extent during the past year, and we have at the present time three lines, well-defined lines, of work.

First, we have a study of the underlying economic principles involved in cooperative marketing. We are arriving at those largely from the inductive method at the present time—that is, we are studying certain well-established cooperative associations, with the idea of finding out what have been the basic principles on which they have been working and which have been the means of making them a success. We are just ready now for the publication of a study of cranberry marketing. We have arrangements made to study certain associations handling citrus fruits and berry products, and there are others we hope to study in the course of the next year.

In these studies we are giving special attention to the question of whether they are stock companies or nonstock companies, whether there are contracts extending over a period of years or no contracts at all, what type of management they are having, what the control of the board of directors is, and other fundamental economic and business studies.

Mr. Anderson. About the only justification for the ascertainment of the facts is to arrive at some conclusions of policy. Are you going to be able to arrive at any determination as to principles and policies of management of cooperatives as a result of these studies?

Mr. Tenny. We hope to. That is the aim of the study.

Mr. Anderson. My observation is, and the only criticism I have to offer is that you get a whole lot of facts, but it does not always lead to conclusions. If it does not, it is purely historical and statistical and is not of much advantage.

Mr. Tenny. If those studies are made by an economist, they ought to lead to the conclusion you point out. I might say that the second study we have in mind is the one that you indicate, and which we do not give as much weight to, but which we think important, namely, an historical and statistical study. We are setting aside a small amount to determine, if we can, just how far cooperative marketing has progressed in this country, and something about the percentage of the business of one kind or another by States and commodities, handled through cooperative associations.

Mr. Anderson. The Census Bureau says $80,000,000, does it not?

Mr. Tenny. Yes, sir.

Mr. Anderson. I think that is very far off.

Mr. Tenny. All of our records would indicate that we know very little about that so far.

Mr. Anderson. I saw from figures the other day compiled by the Department of Agriculture in Minnesota, which claimed over $200,000,000 for the products in Minnesota alone last year were sold through cooperative methods.

Mr. Tenny. We are cooperating with the States very closely as to the historical study. Much of it is being done by the States, and we are simply tabulating the results. We are proposing, in a very limited way, to extend the studies, both historical and economic, to the developments in Europe, although we have gone only a little way in that study.

Mr. Anderson. Have the difficulties of the cooperatives under the application of the income tax, corporation tax law, come to your attention at all?

Mr. Tenny. Not that I recall. So very many of them operate on a cost basis, they therefore file no income tax, as I understand.

Mr. Anderson. That is what they think they do, but the tax division in the Treasury Department does not think so. Many of them are being gone over now and are being assessed taxes back to the limitation period, which is proving to be a very great deterrent to cooperative development in Minnesota. The trouble is if they have a single item which indicates profit in any way—they set up a reserve, for instance, for a bad business year, if they pay dividends to nonmembers they take·now the exempted class, and a tax is levied against them, and it is making a hardship in our country. I did not know whether that had come to your attention.

Mr. Tenny. The third study in cooperative marketing is a legal study. We have had a great many calls for service work, and we have also felt the need very vitally of having a very clear and definite study made of the decisions of the various courts, especially the higher courts, relating to certain phases of cooperative marketing, and during the year we have increased our force in this project by having a well-trained attorney, who is devoting his entire work and time to the study of legal phases of cooperative marketing.

Mr. Anderson. I wish you would turn him over to the Treasury Department.

STUDIES IN FRUIT AND VEGETABLE MARKETING.

Mr. Tenny. That completes the $14,000 item under cooperative purchasing and marketing.

The second item is the fruit and vegetable marketing studies. The chief work undertaken in this project has been with relation to the standardization of these projects. Definite standards have been established on the following commodities: Potatoes, bermuda onions, north grown onions, and sweet potatoes. Grades have just been recommended for barreled apples, cabbage, peaches, tomatoes, lettuce, cauliflower, cucumbers and asparagus, and just recently in the same class of work on shelled white Spanish peanuts.

Mr. Anderson. These standards are not legally effective?

Mr. Tenny. No, sir.

Mr. Anderson. Are they pretty generally adopted?

Mr. Tenny. A large number of the States have enacted legislation during the last two years which gives authority to State agencies to make compulsory, if they so desire, grades that have been tentatively approved and promulgated by the Federal Department of Agriculture. In that way grades for white potatoes, for instance, are becoming pretty well established, and much of the trading has been done during the last year on the United States standards. Sometimes the standards have a State name attached to them. We do not attempt to discourage that at all.

Mr. BUCHANAN. Does this classification refer to the quality of the products and its container?

Mr. TENNY. No; this relates to the quality of the product only.

We have felt the need of assisting the States in putting these grades into operation. We have partially from this appropriation, and partially from a State cooperative appropriation, cooperated with the States of Idaho, Oregon, Washington, California, Colorado, Texas, and they have regularly signed a memorandum of understanding whereby we are assisting them from a standpoint of standardization work to put these grades across in their State. In a limited way we are working with Maine, New Jersey, New York, Pennsylvania, Florida, Missouri, and a number of other States, so that there has been a very marked progress in standardiaztion of fruits and vegetables during the past two years.

Mr. BUCHANAN. From a practical standpoint what method would a producer pursue to get it known, or get his products marked, that come within one of the classifications, and in a standard grade of that class?

Mr. TENNY. Of course, first, he must be thoroughly familiar with the grading rules and regulations. He will write in to us, and, if we are not cooperating with the State, we will deal with him directly, outlining to him just how he must grade his stuff to meet the requirements of the tentative grade, purely educational from our standpoint, and then if he has done that he has the absolute freedom to mark that package "U. S. No. 1 Potatoes." If they do not come up to the standard, then we have some regulatory work to do on it.

Mr. BUCHANAN. Then it all depends on the integrity of the individual producer, and if the public can be duped or fooled, and an individual producer havihg a right to mark a product "U. S. No. 1 grade," they may not be that grade at all, and the public can be fooled.

Mr. TENNY. It is my understanding that we have the right to enforce that grade, provided the shipment moves in interstate commerce. As a practical matter, the work is in the hands of the States, and there is not very much call for the grades on the part of individuals, unless the State is undertaking a campaign to put those over as State grades, and usually there is a State shipping point inspection, which is the case in Missouri, one of the States I have mentioned.

Mr. BUCHANAN. Will you agree with me that a classification made by any other agency than a State or Federal inspector is practically valueless, as a general rule?

Mr. TENNY. Yes, sir; I should say so. Of course, the California Fruit Growers' Exchange is different.

Mr. BUCHANAN. In the case of an individual producer, who produces the article himself, and classifies it himself, that could not be relied upon.

Mr. ANDERSON. Is not much of this grading and shipping of potatoes done by cooperative associations?

Mr. TENNY. Yes; in individual States, and then in other States it is largely the individual shipper.

Mr. ANDERSON. Where production is widely scattered, I suppose that is true, but I have an impression that in my State there would be a grade by cooperative association, or shipping associations, which gather quite large quantities and ship them.

Mr. TENNY. As I recall it something like fifteen or twenty thousand cars of fruit and vegetables were inspected in Colorado this year.

Mr. BUCHANAN. By whom?

Mr. TENNY. By the State, under a shipping-point inspection law. Our grades, Federal grades, are being used as a basis of that work, and we are cooperating with the State in an educational campaign to have our grades thoroughly understood by the State inspectors. We have, of course, no authority to do shipping-point inspection work, and do none.

Another project under the fruit and vegetable appropriation is the study of packing houses, and we have completed a study of the peach-packing houses, and peach-grading machinery, and have issued a bulletin during the year on that.

We are also studying methods of marketing at the present time, making an exhaustive study of methods of marketing, beginning with an auction study. We have a man in the auctions studying methods of handling fruits and vegetables, not on the basis of cost, but on the basis of method. That ought to be extended to include the cost study ultimately. We have a small item set aside, known as transportation investigations under this marketing and distributing fund. This is primarily used to maintain a group of two or three men, who interest themselves in seeing the railroad officials and division heads and getting statistics for the market news. We are also doing some work in cooperation with the Interstate Commerce Commission and State organizations, to assist in getting cars under emergencies, simply without any authority, but to assist the growers.

Mr. ANDERSON. I do not see any necessity for that. You have car service sections now.

Mr. TENNY. That is a very minor part of their work, and in only a few cases where the pressure has been strong have these men used their personal relations with the railroads to bring about an easement along that line.

Mr. ANDERSON. That is a very big subject, and I do not think it ought to be monkeyed with on any small basis.

Mr. TENNY. We are studying and analyzing the effects of transportation rates, and changes on certain methods of handling fruits and vegetables, as another small portion of that work.

Mr. ANDERSON. You had at one time in this bill a study relating to refrigerator cars. That was under this item.

Mr. TENNY. No; under the item transferred to plant industry.

STUDIES IN COTTON HANDLING.

The next item is cotton-handling work. This is one of the cases where we are bringing a special appropriation under our present fiscal year, under the marketing and distribution sum. We can get a better picture of the work if we discuss the whole of the work as one item, irrespective of the fact that it appears in two places. This work might be classified into two general groups. First, we are utilizing somewhere around $20,000 of the fund in an effort to improve cotton-marketing conditions, by what we might class as an intensive educational campaign at local points usually with small cooperative associations to demonstrate the advantages of using grades, official grades, and especially of having the farmer know his cotton grades before he sells it.

To accomplish that we are cooperating in the employment of a State leader for the work in North Carolina, South Carolina, Mississippi, Arkansas, Oklahoma, and Texas. These men usually make arrangements with the local cotton associations, frequently not a real marketing association but perhaps a group of farmers interested in seeing their cotton graded, and it will employ under our direction a local cotton classer. We do not pay any salary. We give him an official standing, making him a collaborator, so we have some power over him, to a certain extent, so that in classifying the cotton for the local people he is living up to our cotton grades. We feel this particular work is really of very much importance, because unless the individual farmers are familiar with the advantages of having cotton classified it is pretty hard to get the cotton moving along in line properly classified, and so this is an effort to educate the farmers on the cotton grades.

The second study relates to the study of grades, with the idea of seeing whether the grades are right. At the present time we have been making a study of the American Egyptian cotton in the Southwest, and have determined that the color specifications on that cotton are not correct; in fact, we have definitely reached that agreement. They were made back several years ago, when there was a good deal of disease which discolored the cotton, and this division has prepared tentative proposals, showing the grades which they are going to present to the Secretary, with the idea that under the law in a short time we can have some changes made in grading that variety of cotton. Then we are also doing a good deal of work in the study of physical losses from improper handling after cotton is baled. That ties up with our warehouse work, but is being paid for out of the marketing and distributing fund. The losses from discoloration and waste are determined, and then we carry those studies through to studying the cotton itself, making spinning tests of it, to determine how much actual loss there has been in the spinning quality. We have extended that now to some cooperative work with Plant Industry, whereby we are developing rather an exhaustive study on the improvement of cotton varieties in the light of spinning tests we are conducting, and that is especially applicable to the southeastern territory; through the cooperative work of Plant Industry we hope to get the farmers to adopt one variety of cotton that has better spinning value than their present mixed varieties. We are doing the technical work in cooperation with Plant Industry.

Mr. BUCHANAN. You do not attach any other value to the cotton other than the spinning value, do you?

Mr. TENNY. I can not answer that.

Mr. BUCHANAN. You emphasize that spinning value all the way through. I want to know if there is any value of cotton not determined by the spinning question.

Mr. **Meadows**. The commercial value results from the spinning value. The commercial value is the same thing. It results from the spinning value.

Mr. **Buchanan**. The object of the department is to determine the spinning value, is it not?

STUDIES IN LIVE STOCK, MEATS, AND WOOL.

Mr. **Tenny**. That is correct.

In live stock, meats, and wool studies, we have devoted the larger portion of our funds to a study of market classes and grades of live stock and meats, and we have now ready for publication in the near future bulletins on market classes and grades of beef, veal, lamb and mutton, pork and pork products, miscellaneous meats, cattle and calves, sheep and lambs, and hogs, also one covering the study which we have finished on soft, oily, and firm pork.

Mr. **Anderson**. Did I understand you to say that these grades were tentatively established?

Mr. **Tenny**. They have not yet been promulgated. The first drafts of them have been written, and we are discussing them in the light of the packer legislation, and getting them in final shape, so that we can publish them.

Mr. **Anderson**. Is there much progress in the direction of grading cattle and meat? Are many people adopting grades?

Mr. **Tenny**. I do not believe that the work has progressed far enough yet so that the trade in general knows what we are going to promulgate with regard to the grades. We have studied with individuals, and those people would know.

Mr. **Anderson**. As a matter of practice, is there not now a more or less loose but nevertheless existing grade of beef meat?

Mr. **Tenny**. The difficulty with those is the same as with wool and other products. They do not mean the same thing in different places and by different people. We have loosely defined grades, but our work, of course, aims to bring those loose definitions, loose usages, into a well defined definition.

Mr. **Anderson**. A differentiation is made in price between different grades of meat now. The lines of demarcation may not be well defined but there certainly is. There is a differentiation of price based on quality.

Mr. **Tenny**. Yes; our studies start with the very best practices in the trade. We are also, as Mr. Erdman pointed out, using a small amount in this allotment to help the cost of marketing work out, and broadening that study to include methods of marketing live stock. Considerable additional work has been done on the wool grades during the last year. We are not absolutely sure that the wool grades are correct. They are only tentative, and we have attempted to do a good deal of experimental work in the field trying out tentative grades on wool, to see whether they work, and there has got to be additional work done on this.

STUDIES IN MARKETING DAIRY PRODUCTS.

Marketing dairy products. This study has been in connection with the standardization work. The field has been broadened somewhat, to include poultry products, which is a part of this project, and we have added a specialist on standardization of poultry products, especially eggs. There is a good deal of interest in a number of States in arriving at a different basis of grading eggs, and we have one man devoting his entire time to that study.

We have been devoting a good deal of time to the studies of marketing dairy products. There has been a good deal of unrest in the country on the part of milk marketing associations about milk marketing methods, and we have had to devote quite a little time and money to bring these studies together, and arrive at the facts relating to marketing dairy products.

STUDIES IN MARKETING HAY, FEED, AND SEED.

Hay, feed, and seed is the next project, and in this project we have made distinct progress during the present year and are now ready to promulgate definite tentative grades on timothy and clover hay. These studies have been running over a period of years, and we feel the preliminary work has been done, and feel ready to put out tentative grades on these two products.

The law, which will be discussed later, is broad enough to have market inspection on these products as soon as the grades are officially promulgated. The question of how extended a market inspection service we can furnish on those will depend on the appropriations.

We are reorganizing the seed studies and we hope to work out in cooperation—in fact, we are starting a project in cooperation with Plant Industry to consider the feasibility of extending the certified seed work. Certain developments of farmers' cooperative associations have given a very marked impetus to the purchasing of better seed, and a great many of our State organizations and the farmers want to buy certified seed. They do not mean much at the present time. At the present time anybody can call anything certified seed. Certain States have made rsetrictions that confine the use of the word "certified" to certain restrictions, but we feel that there is a great need of a study, including the entire question of certified seeds. We recognize that this is a study which must be done in close cooperation with Plant Industry, because it is a production problem very largely, but it has a marketing aspect which is important.

Mr. **Anderson**. Have you gone into the question of the cost of marketing hay?

Mr. **Tenny**. I think not.

Mr. **Anderson**. Dr. Erdman, have you taken this up?

Mr. **Erdman**. No; we have not.

Mr. **Anderson**. I have an impression there was a good deal of abuse in marketing hay.

Mr. **Tenny**. There is a small item for market information of $9,000, which is used for editorial work on the publications relating to marketing work. There is a small item, set up for cold-storage investigation, which has been used in keeping in touch with cold storage and assisting, to a limited extent, in developing some records adaptable to cold storages, and we have utilized one man on some studies of cold-storage problems of the Center Market for the last half year.

GRAIN INVESTIGATIONS.

Under grain investigation there is an item used for continuing the study of grain grades. During the year additional work has been done, especially on official grades for rye, barley, grain, sorghums, and rough rice. As a matter of fact, tentative standards for grain sorghums and rye have been established and are ready to be made, effective under the grain standardization act. This study is wholly on standardization work, working up to the grain standards.

Mr. ANDERSON. You have standards on wheat and corn and rye, and also on rice. Is it going to be necessary to continue this appropriation forever?

Mr. TAYLOR. I would like to say, as I indicated in my first remark, as this grain grading work is brought to a completion, we want to be able to give more and more of the effort and funds of the bureau to the study of the marketing processes and the costs of marketing, with a view to developing a clear picture of the whole, process from the time the produce leaves the farm, until it reaches the consumer. The matter of establishing a basis of enforcing the grain standards, and the importance of the inspection work on fruits and vegetables made the standardization work come first in development, but as this work draws to completion, more and more of the funds can go to this larger work of studying the complete movement.

Mr. ANDERSON. I understood the Secretary had been making some investigation of the application of the grain standards. Do you know if any further consideration has been given to that subject?

Mr. TENNY. Mr. Morrill will handle that subject.

Mr. TAYLOR. I wish to say it is true, however, we are finding new problems arising, so we will continue to need to study grain, to some extent, but not to as large an extent as we have in the past. In the last season we have studied spring wheat grades, with a view to satisfying the demand for a readjustment of those grades.

Mr. ANDERSON. I understand that no grades are ever established for all time. Some money has to be spent on keeping them up to date, in the trade practices, and all that sort of thing, but it struck me that there ought to be some diminution of the amount of money necessary to spend on this project, as these standards are established.

Mr. BUCHANAN. How does the farmer who raises the grain ascertain whether or not his grain comes up to standard grade?

Mr. TENNY. I think Mr. Morrill could answer that. That is a part of the grain standardization act procedure, and that is covered in the special appropriation for the enforcement. If there is no objection I would prefer to leave that until to-morrow. There is only one other item which needs to be discussed in the appropriation for marketing and distributing farm products, and that is $70,000 for state cooperation work. In the sheets which you have I think they show $83,180. This is $13,180 more than the present appropriation shows, due to the fact that farm management has $13,180 for state cooperative work, and with the idea that the bureau is to include the two lines of work it has been merged into the one item.

STATE COOPERATION WORK IN FARM MANAGEMENT.

The State cooperation work in farm management, as I understand it, is wholly devoted to extension work of farm management practices. In marketing, the $70,000 appropriation I can summarize in general under four heads. We have utilized a good deal of this appropriation in standardization work. We are utilizing it this year on the study of tobacco grades. There has been an insistent demand from the trade, and a need on account of the warehousing law for tobacco grades. The States are very much interested in this, and have been willing to carry a large part of the expense, and we are cooperating in Kentucky, North Carolina, Ohio, Virginia, Pennsylvania, and Wisconsin, in maintaining an investigational force in those States cooperatively in every case with the State, to study the tobacco grading work.

Mr. **Buchanan.** I had the impression that this $70,000 was spent for extension work in cooperation with the States on a 50–50 basis.

Mr. **Tenny.** The work started several years ago very much on that basis. This was extended on that basis until the States had a pretty well equipped force to handle marketing work. Then they found the need of having special assistants on particular kinds of work that had a national aspect, so we have been going through a process of having the States—in a good many cases they have been willing and anxious to do it—carry their own machinery to handle the larger part of their work, and that leaves our funds available to employ specialists in the States that are not doing extension work wholly, but also doing investigational work and especially standardization work. For instance, we have definite cooperative agreements in Colorado, California, North Carolina, Texas, Washington, and unofficial agreements in Pennsylvania, New York, New Jersey, Maine, Florida, and Wisconsin, where we are doing standardization work on one product or another. We are still doing it on the 50–50 basis; that is, we are still doing extension work on the 50–50 basis in Michigan, Nebraska, North Dakota, and Tennessee.

The fourth item is the work done on the cost of marketing live stock. We are cooperating with nearly all the corn-belt States in that study, and only a portion of that is being paid out of the State cooperation fund.

Under the item here we have "preservation of fruits and vegetables in transportation and storage," which has been transferred to Plant Industry; foreign marketing investigations, which originally were on this appropriation, have been taken out and appear as the next item, as agricultural competition and demand in foreign countries.

That completes the outline of the appropriation.

COTTON GINNING.

Mr. **Buchanan.** I want to ask you whether or not the departments, so far as you know, ever made an investigation as to the effect on the staple or spinning value of cotton of the ordinary gin and the roller gin. I understand the gins are used for long-staple cotton, because the ordinary gin cuts the staple. Does it cut to any extent the staple of ordinary cotton? What would be the difference in that cotton or the staple value of that cotton if all cotton was ginned by the roller process?

Mr. **Meadows**. The department never conducted an experiment exactly as you outline. It had this matter in mind, however, but some economical questions come into consideration that probably make it unnecessary to make the experiment. The cost of ginning on the roller gin is so excessive that it is not profitable to gin short-staple cotton on the roller gin.

Mr. **Buchanan**. If you made the experiment and demonstrated that the roller gin would add materially to the cotton, as there are so many million bales raised yearly, it seems to me the experiment would be worth while.

Mr. **Meadows**. Short cotton usually grows very tenacioulsy to the seed, whereas long-staple cotton in Arizona and California does not grow so tenaciously. It is easy to gin long-staple cotton with a roller gin, whereas it is a slow process to gin short-staple cotton on such a gin.

Mr. **Buchanan**. However, if there is a difference in the value of short cotton ginned on the roller gin, if this difference in value was sufficient, inventive genius might bring it further, so as to gin it cheaper.

Mr. **Meadows**. It has been worked on for 100 years. Inventors have worked on it and have never perfected a roller gin that will remove short-staple cotton from the seed, except at a slow rate, which makes it too costly to be generally adopted.

PROMOTING UNIFORM STANDARDS OF CLASSIFICATION OF AMERICAN FARM PRODUCTS.

Mr. **Anderson**. I would like to ask you this: You seem to be taking a good deal of territory here. The new language on page 219, covering demonstrations for the use of uniform standards for American farm products throughout the world, etc.——

Mr. **Tenny**. That wording in the appropriation is used in order to bring the special appropriation under marketing and distributing fund. It has been found necessary to broaden the language to include some work that was done under another specific appropriation.

Mr. **Anderson**. I do not recall that language.

Mr. **Morrill**. That identical language does not appear in the present appropriation, but that is the nature of the activity being carried on for cotton, which reads, "for investigating, demonstrating, and promoting the use of cotton standards." It has been necessary to carry on this work in this country and in Europe.

Mr. **Anderson**. You mean demonstrations of the grades?

Mr. **Morrill**. Yes; in order to attempt to bring about the elimination of the two sets of standards that we have for marketing cotton and the substitution of one set, either our standard or the Liverpool standard or a compromise between the two.

Mr. **Anderson**. Every year we have had this appropriation up we have been on the verge of doing that.

Mr. **Morrill**. It is a slow process, and if you ever deal with an Englishman you will realize it. We are making progress, and the Englishman's territory is being narrowed. It has been substantially narrowed during the past year or so.

We reached the point where the Italian merchants have agreed to permit the use of American standards, as well as the Liverpool standards, in marketing cotton in Italy. All contracts previously were made on the Liverpool standard. Now they have opened the gates so that we can sell cotton in Italy on the American standards. A step has been made in that direction in connection with the Bremen Cotton Association, which largely dominates the marketing of cotton in Germany, and they have reached the point where they are considering adopting our standard for the basis of the sales of cotton in Germany, at least as an alternative for the Liverpool standard, if not as a substitute. Mr. Meadows and I were in England, Italy, and Germany during the past year, and we found a situation which makes it more promising than it ever has been before, to get our cotton sold on our standards. There is a feeling that the Liverpool standard, plus Liverpool arbitration, results in an uncertainty in the marketing of American cotton that should not be there. The Liverpool Arbitration Committee is composed entirely of Englishmen, resident in England, who are not wholly engaged in classifying cotton. They are men who have a connection with the trade, and it is quite obvious that marketing conditions from year to year will have some influence on their judgment in their arbitrations.

In Italy, at Milan, the president of the cotton association told us that the thing that disturbed them most was the fact that in one year the decisions were against the Italian merchants and the next were in favor of them. Of course, for the moment, it is pleasant to have a decision in one's favor, but it was a disturbing thought to the Italian cotton merchants. They wanted to get on a permanent basis. The standards established by the Liverpool cotton associations are prepared in Liverpool from cotton they receive, and the standards are sold at a price which is practically prohibitive. I think they sell for something like $600; that is, delivered in this country for a complete set of standards, while a set of American standards cost $100. Moreover, they are unwilling to make a general distribution of their standards. They will not sell their standards in this country to anyone except an organized exchange, and then under certain conditions that that exchange must meet, and the standards can not be renewed frequently, because of the expense, and it is very difficult for anyone in this country to find out just exactly what standard it is that he is selling on when he names a Liverpool standard.

Mr. ANDERSON. Have Liverpool standards been maintained on the same basis for a long period?

Mr. MORRILL. We went up against that, and were told these standards had been in existence 27 years, that English court decisions were based upon them. To a cotton man it is foolish to talk about court decisions.

Mr. BUCHANAN. What do you mean by cotton standards? How do they arrive at them?

Mr. MORRILL. When we speak of the Liverpool cotton standards and our standards, from the standpoint we have been discussing, we refer to the grade. The length standards are a separate proposition. They have none in England. We have. In England the length of the staple is regarded as a proposition entirely separate from grading, as it is here, but in England it is a matter of value, with no fixed standard of length. In the United States we have fixed standards, which form a fixed basis for a determination of a dispute. So far as the grades are concerned, theoretically they are established in the same way, that is to say, by the gathering of samples representing various growths of cotton, and placing those samples in boxes, to enable a person to judge whether his particular lot of cotton comes up to the standard or not.

Mr. BUCHANAN. In England that is determined by the amount of foreign matter in the cotton, and the whiteness, and whether or not the cotton is clean.

Mr. MORRILL. Primarily all cotton grading is determined on the basis of foreign matter, and to some extent color and general appearance. Grading does not have the same meaning in cotton as in grain. It is not as comprehensive a term. Length of staple and strength are not included.

Mr. BUCHANAN. It ought to be.

Mr. MORRILL. If we made length of the staple a part of the factors in the determination of grade, we would have to multiply the number of cotton grades very many times. As it is now, we have 20 grades officially designated for cotton, including the white, tinged, and stained cotton. We have lengths of staple capable of being stated accurately in any variation down to one thirty-second of an inch, beginning with three-fourths of an inch—all cotton below three-fourths of an inch is called "below three-fourths inch in staple"—and running up to any length of cotton that may be grown. Take your basic grade, middling—you can have any length staple, the value going up or down in proportion to the increase or decrease in the length of the staple.

Mr. BUCHANAN. When a Government agent classifies cotton, or when he is certified for employment by an organization of farmers in a cotton State, when he classifies that cotton, does he take into consideration at all the length of the staple? I do not mean in naming the class, but in his entire work does he take into consideration the length of the staple?

Mr. MORRILL. The staple is stated along with the grades, but separately. In other words, the classifier takes a sample and looks at it, and his first examination determines the grades. He says that is middling. He pulls the fibers until he gets a typical portion, and then he says that it is seven-eighths, or whatever it is. The two constitute the classification. There are other things which he determines at the same time, such as, for example, whether it has been gin cut, or whether it is mix packed, or some other things of that kind which serve to affect its value.

Mr. ANDERSON. Is all that stated on the certificate?

Mr. MORRILL. Yes, sir.

Mr. BUCHANAN. Did the department ever take any steps, or what do you think about taking such steps, to establish the length of the staple, and carry that item in market quotations—for instance, middling cotton, fair middling, or middling fair—the length of the staple, so that this could be quoted in the newspapers?

Mr. MORRILL. Our service bulletins that are distributed in mimeograph form throughout the cotton section of the country, and our Market Reporter, both carry all the quotations that we can obtain for the various lengths of staple.

Mr. BUCHANAN. What I am getting at is this: Would it be carried out through the cotton world and given to the daily newspapers, these quotations, based on cleanliness and the staple? It ought to have been that way from the beginning.

Mr. **Morrill**. For the proper information of the producer and everybody, there ought to be a general dissemination of the quotations for all the staples marketed, and that is what we are trying to bring about through our Market Reporter. We are trying to tell these people what the difference is in marketing value, and, through the medium of educational work that Mr. Tenny spoke of, to get it back to the farmer himself.

Mr. **Anderson**. Are there enough important sales of grades of cotton to make possible quotations currently on all of them?

Mr. **Morrill**. Not in every market every day, but in some market every day throughout the cotton-marketing belt. In other words, so far as actual sales are concerned, there is hardly a grade or length in staple that we can not find a sale for. It will not occur every day, but as to the grades, as distinguished from length of staple, those grades are quoted every day in at least 10 markets, that are used as a basis of settlement of future contracts.

Mr. **Anderson**. Is that a spot quotation?

Mr. **Morrill**. Yes, sir; it is arrived at in this manner. If you have strict low middling cotton, which is the next grade below middling, sold to-day at 100 points, or 1 cent below middling, and to-morrow you have no sale of strict low middling, but you do of low middling, and that sale of low middling is 50 points lower than low middling sold the previous day, then strict low middling drops down, but the minute a sale appears the quotation takes the price of the actual sale.

LENGTH OF STAPLE.

Mr. **Buchanan**. In your settlements under the futures act, is length of staple taken into consideration?

Mr. **Morrill**. Yes, sir; it is always stated on every certificate we issue. It is always stated on every certificate we issue for the New York or New Orleans Cotton Exchanges.

Mr. **Buchanan**. Then why should not the length of the staple be considered in your grades, in fixing your grades, your standard grades?

Mr. **Morrill**. You can have every length of staple in every grade.

Mr. **Anderson**. You can have all the information as if you graded it on that basis?

Mr. **Buchanan**. Every day you have in the papers the market price of cotton middling, so much. They absolutely disregard length of staple, and leave that for the farmer, who knows nothing about it, and leaves it in the hands of the cotton buyer, who knows all about it. What I am trying to bring about is daily quotations throughout the country, based on statements.

Mr. **Morrill**. The quotation for middling does not disregard length of staple. Whenever you see a quotation for middling, that is understood as cotton seven-eighths inch or more.

Mr. **Buchanan**. I know that if there is any longer staple it does not take into consideration increased value.

Mr. **Morrill**. Then you have to quote the differences separately, starting with middling, seven-eighths inch as a basis.

Mr. **Buchanan**. Yes. I want the length of the staple to figure as an element in the daily quotation, for instance, middling cotton would not be middling cotton unless it was seven-eighths of an inch long, or something like that. It would not be middling. In other words, your classification would be based on certain lengths of staple, as well as grade. When you bring that out you will save the farmers money, because they are at the mercy of the cotton buyers; when they have a cotton that is longer than middling they do not get any more value for it in the world, and you realize that they have been beaten out of millions of dollars.

Mr. MORRILL. We, of course, have plenty of publications, plenty of facts to show that what you say is true. Farmers are not getting the value for the cotton that they ought to have, and in order to give that value to the farmers we have carried on the quotation service, and have carried on the work that Mr. Tenny spoke of, so that they will pay attention to the fact that the cotton may be better than middling of seven-eighths inch staple.

In other words, bearing upon the cotton on which the quotation is based, when they find out, for example, the cotton is one inch and an eighth they will get two or three cents additional premium, and they ought to have it.

Mr. ANDERSON. Is the difference between the values of the different lengths of cotton in the same grade more or less arbitrary and fixed, or is it variable according to the conditions existing from day to day?

Mr. MORRILL. It is variable. The differences quoted are not fixed for future trading; they are based on what has happened in the market on that day. The next day the difference may widen or narrow according to some local condition, or perhaps some general condition that reflects itself back locally.

Mr. ANDERSON. Is that a very wide variation?

Mr. MORRILL. It may be what seems to be a wide variation in some cases. In one section of the country middling may be an inch and an eighth in length, and it might have better body or better character than cotton of the same grade and length of staple in another section of the country. That will be recognized in the difference in price, because people who become familiar with the cotton in different sections of the country know that, and it is recognized.

Mr. ANDERSON. Is there anything comparable in the sale of cotton with the sample sales that take place on the grain exchange?

Mr. MORRILL. The process of marketing cotton has not developed as far as the process of marketing grain. They do not have anything like an exchange floor, where samples are gathered together in one place, as in the case of grain. All of the ordinary cotton marketing is done on the basis of samples in the offices of the different dealers, or on the streets. If the seller is anxious to sell his cotton he hunts a buyer, and if the buyer is anxious to buy cotton he hunts for the seller. Perhaps in the case of small country towns the farmer takes his samples, or his cotton, on the street.

Mr. ANDERSON. In the case of the settlement of future contracts is the settlement made without reference to the length of staple on the basis of the grades?

Mr. MORRILL. Not wholly so. The future contract is based upon the assumption that seven-eighths inch cotton will be delivered. That is the shortest length that may be delivered in the settlement of a future contract. The settlements are based upon the assumption that the cotton is not longer than seven-eighths of an inch, unless it comes to a point where there is a difference in a certain proportion of the cotton, when the rules of the exchange provide for a premium being allowed when that is found to be the case, and that is settled by arbitration.

Mr. ANDERSON. Is cotton below seven-eighths of an inch long accepted for delivery of a future contract, or is it eligible at all?

Mr. MORRILL. It is not eligible; it is rejected.

Mr. ANDERSON. What proportion of the cotton crop is below seven-eighths of an inch?

Mr. MORRILL. There have been a great many attempts made to estimate that, and it is all an estimate. There is no organized inspection of cotton throughout the country which would afford definite information, as to grades or lengths of staple. It has been estimated, however, that all the way from 3 to 15 per cent is below seven-eighths of an inch.

TEN SOUTHERN CITIES COMPRISING PRIMARY SPOT MARKETS.

Mr. LEE. Will you put in the record the names of the 10 primary points of which you spoke?

Mr. MORRILL. Mr. Lee has asked what are the 10 designated spot markets the quotations of which are used to settle differences on future contracts. Those are New Orleans, Houston, Galveston, Dallas, Little Rock, Memphis, Montgomery, Savannah, Norfolk, and Augusta.

Mr. ANDERSON. Are these the natural commercial delivery markets?

Mr. MORRILL. Those are the most important spot markets in the South, selected with reference to volume of business, and with reference to securing quotations that in our opinion reflect the grade values. There are quite a number of other markets of more or less importance that have been designated by us, you might say, as secondary markets, which might be used if any one of the 10 were dropped out. But the 10 we have selected are the ones which come nearest to an accurate reflection of the current commercial values.

COTTON GRADES—MIDDLING COTTON.

Mr. BUCHANAN. You have established 20 grades?

Mr. MORRILL. Yes.

Mr. BUCHANAN. One of those is middling cotton?

Mr. MORRILL. Yes.

Mr. BUCHANAN. When you say "middling cotton" what do you mean, so far as the length of staple is concerned?

Mr. MORRILL. When you say "middling cotton," theoretically speaking, you mean nothing, but commercially it means seven-eighths inch cotton.

Mr. BUCHANAN. Have you not stated that incorrectly? It means not shorter than seven-eighths of an inch, does it not?

Mr. MORRILL. I am speaking for the cotton belt as a whole. It is not shorter, but, as a practical matter, when they quote middling cotton they are speaking of cotton according to the section of the country. It may be anywhere up to an inch.

Mr. **Buchanan.** When you find a quotation of middling cotton, you mean cotton not less than seven-eighths of an inch; is not that a fact?

Mr. **Morrill.** That is right.

Mr. **Buchanan.** It makes no difference whether it is seven-eighths of an inch, or an inch and a quarter, it is still middling.

Mr. **Morrill.** It is still middling, but the quotation does not read that way.

Mr. **Buchanan.** I just want to show you where injustice is being done, and I believe you want to see it, if it exists. Your quotation goes down and the farmer looks at the paper and sees middling cotton quoted at 15 cents. His cotton may be worth 20 cents, but still be middling cotton.

Mr. **Morrill.** Yes.

Mr. **Buchanan.** But if it is shorter than seven-eighths of an inch it will not then be middling cotton.

Mr. **Morrill.** Yes; it will still be middling cotton.

Mr. **Buchanan.** But while it will not be adjustable under your futures act, it will be excluded entirely.

Mr. **Morrill.** It will not be delivered on future contracts; that is perfectly true, but the designation "middling" means nothing with reference to the length of staple, except as the trade accepts it.

Mr. **Buchanan.** I understand that, but you establish a grade of not less than seven-eighths of an inch, and that is adjustable under the cotton futures act as middling cotton. It must not be anything else, so the cotton buyer or cotton speculator is protected in that, and yet the farmer's cotton may be an inch and a quarter, and he is not protected in that. That is, however, not what I am trying to get at so much as the other proposition. If your middling cotton embraces not only cotton of a certain color and with absence from foreign matter, but there is also a limit on the length of staple, and so on, up throughout the various grades, then that grade, as actually quoted would represent the actual value of the cotton. But it is based on only one-half of the elements of value, absence from foreign matter and color.

Mr. **Morrill.** I think I understand what you mean. But the difficulty I have in dealing with your question is that I always try to follow your question through each of the grades. If we have gradations in length of staple, beginning with three-quarters of an inch, then going to seven-eighths, and then an inch, and then divide it into thirty-seconds of an inch up to 2 inches, we would have from 32 to 35 lengths of staple, all of which are middling cotton. What is going to become of your grading system?

Mr. **Buchanan.** You need not run it up thirty-seconds; you can just run it up to the 20 grades.

Mr. **Morrill.** Your 20 grades have nothing to do with the length of staple.

Mr. **Buchanan.** But you could make them have something to do with it. Suppose you say middling cotton; you have certain classifications, such as color and absence of foreign matter for middling cotton. Suppose you say it shall run from seven-eighths to an inch or an inch and a quarter, and then on up so that you have ordinary cotton, fair middling, middling fair, and so on up, and provide that they all shall have such a length of staple. Then your grade represents the actual grade of the cotton and includes not only absence from foreign matter and color, but also length of staple. Why not go the whole hog, since you are grading cotton, and put in every element of value?

Mr. **Morrill.** When I first came into the Department of Agriculture and I first heard about the cotton grades I raised the same question you did, and Mr. Meadows will bear me out that he went through a great deal of pain and discomfort in trying to explain that to me. I thought that, based upon grain grades, or some other grades to be considered, it would seem that you ought to be able to include the length of staple as one of the factors of the grade, and simply say this is middling cotton, which means everything. When I say middling, I do not mean any cotton less than seven-eighths or more than an inch. If I do that and say that middling cotton means cotton which, as to color and trash, has certain characteristics, and if, in addition, is not less than seven-eighths or more than an inch, then I have to provide for all the lengths above an inch which do occur in the same kind of cotton which has the same color and trash and is the same apparently in every respect except length of staple.

Mr. **Anderson.** You would have then 32 different grades under that classification.

Mr. **Morrill.** We actually have those. Every time we say middling we should say seven-eighths middling, one inch middling, or one and five-eighths inch middling as the case may be; we say that every time. We are trying to get the whole cotton trade to say the same thing so that when a man sells his cotton he gets the benefit of whatever additional value the longer length of staple has. It is just a problem of statement more than a problem of valuation.

Mr. **Buchanan.** This is a very important matter because it involves one of the most valuable crops of the United States, and it involves a class of people who are now almost in a bankrupt condition. First, you are bound to admit the classification of cotton by the department was intended as a benefit to the farmer, that he might get the reasonable value of his cotton, and therefore your department established 20 grades so that he might inform himself whether his cotton comes within one of those grades. So that he might know by looking at the daily quotations of spot cotton buyers what his cotton is worth, and within what grade it comes. You have established those grades; the Government has proclaimed those grades. And yet that grading ignores one of the most essential values in the cotton, namely, the length of staple.

What I am trying to get at is to have adopted some method or means, or if necessary, pass a bill providing that the department, when it established grades of cotton shall base those grades upon every value that is in the cotton, whether it is length of staple, whiteness, absence of foreign matter, trash, or whatever you want to call it. If the Government establishes the grade for any standard commercial product it ought to take within the scope of those grades every possible element of value that the product has. What is the practical result? Suppose you took that into consideration, and took the length of staple into consideration in fixing the grade. The farmer would take his sample of cotton, and he might go to a Government classifier, State or Federal, and having the length of his staple, get the standard determined, including whiteness, absence of foreign matter, trash, etc. Then if he would look at the daily quotations he would know the real value of his cotton. As it is now he can look at the quotations and know only the value of his cotton according to its color, and absence from trash. The classifier would classify it on that alone, and leave it at the mercy of the buyer, so far as the length of his staple is concerned.

This is a reform, it is a progressive step, it ought to be taken.

Mr. **MORRILL.** I have here samples of the bulletins which we issue every week at different points in the South. We will take the Charlotte, N. C., bulletin which I have before me. That shows the quotation for middling cotton, which, as Mr. Buchanan says, for the purpose of the quotation, is taken on the basis of cotton not less than seven-eighths of an inch. This particular bulletin quotes the price every day at every one of the points I am going to name for middling cotton: Augusta, Charleston, Dallas, Galveston, Houston, Memphis, Norfolk, and Savannah. It shows also the quotation for the same grades on the same date of the previous year. It also takes three of the spot markets that are of most interest in the Charlotte territory and shows the differences in all of the other grades in the standard set of grades. Take, for example, Norfolk. The quotation for middling fair is 200 points on or 2 cents; strict good middling, 150 points on; good middling, 100 points on; strict middling, 50 points on, the price for middling being 15.75. The same process operates as to grades which are off middling in commercial value. The same bulletin carries for as many points in the Charlotte territory as we can get it, the information and quotations in regard to actual sales of cotton, beginning with Charlotte, where we have a series of quotations: Middling, seven-eighths, 16.63; strict low middling, seven-eighths, 16; low middling, seven-eighths, 15; and so on down the line.

It so happens that most of the cotton marketed throughout all of that section is seven-eighths staple cotton. But we have quotations from Anderson, S. C., of low middling inch, which sold at 14½ cents. We have quotations at Darlington, S. C., of cotton that has quite a good deal longer staple, middling inch and three-sixteenths for 26 cents. The quotation for the middling seven-eighths was 15.75. We also have a middling inch and a quarter, middling inch and three-sixteenths and a middling inch and one-eighth, and a middling inch and five-sixteenths in the same town and during the same week.

Mr. **BUCHANAN.** That is all cotton of that length of staple and over, and it shows a vast difference between these lengths of staple. In fixing those daily quotations in the newspapers of the cotton markets of the United States if you can arrange to take into consideration the length of staple then the farmers generally would get the benefit of it.

Mr. **MORRILL.** That is what we are trying to do.

Mr. **BUCHANAN.** Then if you will let it enter into the establishment of these grades it will get to them much quicker.

Mr. **MORRILL.** The information in this bulletin is copied in the Atlanta Constitution, which has a very large circulation, and other bulletins are copied in other large newspapers, and as fast as possible we are trying to get the newspapers to carry those quotations which you have in mind.

Mr. **BUCHANAN.** How many years do you think it would take to educate the vast number of cotton farmers throughout the State on the length of staple?

Mr. MORRILL. I do not think it will ever be accomplished completely because we have a new generation of farmers all the time, and unless we find some method of improving conditions on the farms they will change a lot faster than they have done.

Mr. BUCHANAN. I am trying to get you to start at the top instead of at the bottom.

Mr. MORRILL. Then we would have a proposition which would be a revolution in cotton grading.

Mr. BUCHANAN. I know it would.

Mr. MORRILL. You would have the same problem of educating the farmer as to what kind of cotton he had.

Mr. BUCHANAN. But if you did that you would have a valuation standard by which he could obtain the full value of his cotton.

Mr. MORRILL. He has that standard now.

Mr. BUCHANAN. He would then have a standard embracing every element of value in his cotton, by which he could go to any place where he could find the quotations and classification and compare his length of staple, absence of foreign matter and color, or look at the quotations in the daily paper and see just what his cotton is worth.

Mr. MORRILL. He can get it now through the medium of this quotation service. We have not yet completed the standardization work in cotton. Grade and length of staple are only two factors. Strength of the staple is something we are working on and using some of this fund to develop some sort of a practical method of determining the strength of staple in terms that can be used commercially and quoted. That is another factor. Then we will not have completed our work in determining the various elements that ought to make up the standardization of cotton.

I did not finish my statement with reference to the Liverpool standard. In July we brought together after a good deal of a struggle representatives of the cotton trade, both of the United States and of Great Britain, for the purpose of comparing the two sets of standards. The Englishmen were unwilling to go any further than a comparison; they were unwilling to even commit themselves to the extent of joining in an arrangement by which experts in the cotton trade would formulate some single set of standards that would be satisfactory. But that comparison was made and it showed some things that were rather surprising to the Englishmen themselves, and it developed some things that were rather amusing to the Americans. It showed that the English standards are divided into three parts, which they call Gulf, Upland, and Texas; that we knew, and of course the Englishmen knew it because they made the standards.

The question was asked of them how they determined that the cotton was Upland, Gulf, or Texas, when they never see the cotton grow, and never come to America to buy the cotton. They admitted that the only way by which they knew what it was, and put it into the three boxes, was to judge by the port bills of lading or other shipping documents that accompanied it. Every cotton man in the United States knows what that means. You can get a port bill of lading anywhere you choose to get it if you want to ship it that way. The so-called Texas cotton might even originate in the short-staple territory, and the Gulf cotton might have originated anywhere in the country. They had recognized that to a certain extent in the deliveries on future contracts in Liverpool. They classed all of such cotton against their so-called Upland standard.

As to the statement that the Liverpool standards have been in effect for 27 years unchanged, and that they have been in the Bank of England where they have remained unchanged, it was admitted during the course of that meeting that in 1916 they revised their standards, and that the 27-year old Bank of England standards do not represent present standards at all. Of course their court decisions go glimmering. That is what the cotton trade of the United States is up against. They make contracts on the basis of the Liverpool standards without knowing what they are. We are trying to get some standard used, whether it is our standard or the Liverpool standard, which will be available to everybody, and upon which arbitration can be based with the certainty that they represent fixed standards.

Mr. BUCHANAN. Then, in addition to that, the Liverpool standards are based upon falsities. They do not know where the cotton comes from.

Mr. MORRILL. That is true, they do not know where the cotton comes from, but we are faced with that proposition to-day. I asked several of them to tell me one by one, where they thought a given kind of cotton, according to our standard, came from. I took men who are recognized as the most expert in the business, and there were almost as many answers as there were men. We knew where it came from and those were the men who said they could place cotton in the different boxes, but they were discredited absolutely when they were handed samples that did not have any tags on them.

SATURDAY, FEBRUARY 11, 1922.

STUDIES IN FOREIGN PRODUCTION OF AND DEMAND FOR AGRICULTURAL PRODUCTS, ETC.

Mr. ANDERSON. We will next take up the item on page 223:

> For collecting and disseminating to American producers, importers, exporters, and other interested persons information relative to the world's production of and need for agricultural products, marketing methods, conditions, prices, and other factors, knowledge of which is necessary to the guidance of American production and the advantageous disposition of farm products in foreign countries, independently and in cooperation with other branches of the Government, State agencies, purchasing and consuming organizations, and persons engaged in the transportation, marketing and distribution of farm and food products, including the purchase of such books and periodicals as may be necessary in connection with this work, $65,000.

The Secretary of Agriculture is here and the committee will be very glad to hear him upon this item or upon any other item of the bill.

Secretary WALLACE. Mr. Chairman, I hope before you conclude your hearings I may have an opportunity to speak on the bill in general. I have come over now because our people told me you were taking up the statistical matter, and while I would like to be here when you take up every item in this bill, the nature of my duties is such I can not do it. I appear with reference to this item because there are certain increases asked for, and it deals with a matter of very, very great importance, not so much to the department as to the entire country, and especially the farmers and the producers.

There are two matters on which I want to speak particularly. I shall not undertake to speak in detail because you have here Dr. Taylor and Mr. Estabrook, the latter of whom has been in the statistical work all these years and can speak much better than I can as to the details.

This item on page 223 carries an increase of $15,000, and the purpose of the appropriation is to strengthen our efforts to secure necessary information as to world conditions in production and also consumption. We have a very fine illustration now, and have had for the last year, of the need of this sort of thing if we are going to direct our own agriculture intelligently. We are very much in the dark both as to the production in competing countries and as to the probable buying by importing countries. Quite evidently, we are going to come in more and more competition with other agricultural surplus-producing countries, and that situation is made all the more difficult because of our changes here at home, especially our changes in freight rates, which have imposed a differential against our own producers and in favor of our foreign competitors; and that is true whether you consider our home markets or whether you consider our foreign markets. As long as we are producing a surplus our prices are influenced by world prices, and when world competitors have the advantage, even of a few cents per hundred pounds in the cost of putting their products into the consuming markets, we are at a disadvantage. In what I am saying about this, I am not discussing the merits of the freight-rate matter at all. I have no intention of doing that.

Mr. BUCHANAN. Has the foreign product an advantage in freight rates after it is landed in the United States over the American product to points within the United States?

Secretary WALLACE. No; not after it is landed here. I was not thinking of that so much. I was thinking of the advantage of getting into this great industrial and consuming section.

Mr. BUCHANAN. Because they are on the coast.

Secretary WALLACE. You understand that under present conditions, while I shall not undertake to speak in detail of rates, because I do not know what the latest rates are, but under conditions which prevail the Argentine producer has been able to lay down his product here in this great consuming strip, this strip of high population, the industrial section of the East, cheaper than our corn-belt farmer has been able to lay his product down here.

Mr. BUCHANAN. By reason of the freight from the interior to the consuming population being greater than the ocean rate from Argentina to that same population.

Secretary WALLACE. Yes; as I say, I am not discussing the merits of the freight-rate question at all, but there is the situation that has got to be reckoned with, and we should make an effort to meet it so far as possible. The important thing is to know possible competition. What are these people producing? What are they going to have to export? Where is it going? What are the conditions in the country to which it is going? What can we do to meet conditions of severe competition? We are very much in the dark as to all that now, and the purpose of the item set forth on this page is to begin the construction of machinery which will enable us to inform ourselves as to conditions both in competing and in consuming countries to which we look for a market. I feel I do not need to enlarge upon that because I think it will appeal to each one of you just as it does to me.

Mr. BUCHANAN. Does the Secretary of Commerce undertake any of that work in connection with the Bureau of Foreign and Domestic Commerce and will there be duplication in any sense of the word?

Secretary WALLACE. I can not undertake to speak for just what they are doing, but I do not think there would be duplication; no. So many of the commercial representatives have neither the knowledge nor the appreciation of the agricultural side of this, and I am not criticising them when I say that because it is perfectly natural they should lack that sort of knowledge. I do not see how any one who does not have both the technical knowledge and the real heart-interest in our agriculture can render the sort of service we must have. Take it in the case of the countries with which we compete, there is the matter of keeping us informed as to crop conditions, as to business conditions, but especially as to crop conditions, to the end we may get a line on about what they are going to export.

Mr. BUCHANAN. Will not your representatives in that instance probably take the authority of the country's agricultural agents as they report conditions? They could not go all over the country and determine that for themselves.

Secretary WALLACE. Of course, that would depend upon the country in which he was located. We gather now, so far as we can, all the information that is available through the official publications of those countries, but there is a great lot of information that can be gathered by a trained man which is not available, and which does not appear. In a competing country, for example, such as Argentina, take the case of corn. There is a lot of information that can be gotten there and transmitted here for interpretation, which will enable us to get a much better idea of what their corn production is going to be than we have ever been able to get before. It simply requires men who are alive to the matter and who have had the technical training to enable them to gather the information we must have. In the matter of temperature and rainfall and weather conditions generally there, information can be gotten directly and indirectly, can be used to very great effect here.

Mr. BUCHANAN. Does Argentina maintain any weather bureau that publishes those things?

Secretary WALLACE. I think so, yes; we are getting everything they make public now, but we have learned, especially in recent years, that there are several lines of information that can be gathered that will be very helpful to us. Also the matter of time is very important. With a man on the ground we can get information much more quickly.

Mr. ANDERSON. There is a great difference, it seems to me, between just gathering statistics in a routine way, which would be, I take it, the method of the Department of Commerce, because it is an incident to their regular work, and gathering and compiling statistics with reference to the solution of a particular problem.

Secretary WALLACE. The business agents of the Department of Commerce and the people connected with our consular offices and embassies can be very helpful in helping bring together information which can be used by a man of judgment who has had agricultural training. We had some men overseas this summer. I think, perhaps, if you will ask Mr. Estabrook as to their observations on that matter, you may get something of help to you in forming your own opinions about it. I do not mean to reflect in any way on the representatives either of the Department of Commerce or the Department of State. The point I am making is that in the very nature of things they are not men who are trained in agricultural lines. They have not the background, and also they must deal with a host of other matters which diverts their attention. There is no reason why representatives of the three departments should not work together for the good of all. This whole matter is so important to the agriculture of the Nation that under more stable conditions and more prosperous conditions we would be justified in asking for very much more money than we are asking now. There has not been any effort, in determining upon this appropriation or upon any other appropriation to set up a great, new organization to do a great big thing all at once. The effort is to simply begin and gradually strengthen the work and build it up as conditions justify, and, as I have said, I feel that each one of you can visualize the whole thing just about as easily as I can.

STATISTICS OF AGRICULTURAL PRODUCTION AND DISTRIBUTION.

Mr. **ANDERSON**. Mr. Secretary, I believe you also wanted to discuss the next item, "for collecting, compiling, abstracting, analyzing, summarizing, interpreting, and publishing data relating to agricultural production and distribution, including crop and live-stock estimates," etc.

Secretary **WALLACE**. Yes. Based on our 1922 appropriations, the funds spent in that division of the crop-reporting work, speaking first of the lump sums only, were approximately as follows: For all cereal crops, $95,000; for live stock, $25,000; for cotton, $20,000; for tobacco, $6,000; and for all other crops, $104,000, making a total of $250,000 for the lump-sum appropriation. Then, in addition to that, there was approximately $120,000 spent on this work in the way of statutory salaries, apportioned in about the same ratio as the lump-fund expenditures. It is interesting to note that in collecting statistics of cotton alone, the Census Bureau is expending $250,000, which is equivalent to the total amount we expended for the cereal crops, live stock, cotton, tobacco, and all the other crops, and for tobacco they are expending $9,000, which is $3,000 more than we expended for the same purpose; and then, in addition, probably $30,000 for statutory salaries.

Of our total farm sales, 36 per cent are represented in the form of live-stock sales and 20 per cent in the form of live-stock products, or a total of 56 per cent of the total sales represented by live stock and live-stock products, while 40 per cent are represented by receipts from crops.

Mr. **BUCHANAN**. Do you mean the value of the sales or the number of sales?

Secretary **WALLACE**. The value of sales. If you take the great surplus-of-grain-producing States, the percentage of total farm sales represented by live stock is considerably higher. For example, in Iowa we estimate that 63 per cent comes from live stock, and in addition 12 per cent from live-stock products, or a total of 75 per cent; and in 35 States the value of the live stock sold exceeds the value of the crops sold.

Now, when you consider the tremendous importance of the live-stock industry, the biggest single industry in the country, the expenditure of $25,000 a year for the collection of live-stock statistics is rather an indictment of our intelligence or business judgment, it seems to me.

We must tremendously strengthen that whole live-stock statistical reporting organization, and included in this estimate beginning on page 224 is an increase of $70,000 which it is intended to spend in the strengthening of our live-stock statistics. We have in the census, once in 10 years, a report on the live stock in the country, but the difficulty with that is that the reports are not always comparable, and we are not able to determine from them the trend of live-stock production. I asked our people to give me just a little statement on that, which was prepared quite hastily, showing some of the things which tend to impair the usefulness of census statistics. In 1910 the census was taken on April 15; in 1920 on January 1. Any one who is familiar with farming and live-stock growing can see the difficulty of making any comparison between figures taken on January 1 and figures taken on April 15. In the case of horses and mules, for instance, of course the 1920 census was too early to catch the colts at all, while the 1910 census did catch quite a number of colts; not the full number, but quite a number, we do not know how many. In addition to that change in the date, the classifications were changes. There were six classifications of horses and four classifications of mules in the 1920 census, while in the 1910 census there were but three classifications of horses and three classifications of mules. In the case of cattle the census of 1910 includes 7,800,000 calves born between January 1 and April 15, or probably about one-half of the calves born in the spring of that year, so that when you take the census of April 15, you see that there is no possibility of a fair comparison between the results of that census and the census taken in 1920 on January 1. Then the classification of cattle in the 1920 schedule is entirely different from that used in 1910. The 1910 schedule did not separate cattle from dairy cows, as was done in 1920. There were seven classifications in all for cattle in the 1910 census, while in the 1920 census there were 11 classifications.

In 1910 the question was cows and heifers kept for milk born before January 1, 1909, while in 1920 the question was cows and heifers two years old and over, under the heading of "dairy cows."

In the case of swine, you can see the comparisons would be still more difficult.

The 1910 census included 23,000,000 pigs born between January 1 and April 15, while the 1920 census taken in January was too early to include any such pigs. Of course, that offset by hogs held over in that period, but we do not know how many there were, and it is difficult to estimate.

Mr. Buchanan. Along that line is it proposed to take a census every year, every two years, or every five years?

Secretary Wallace. No; not to take a census.

Mr. **Buchanan**. I mean the live-stock census, of course.

Secretary **Wallace**. That would require a very heavy expenditure to take a livestock census. But our thought is to build up an organization which will not take a census necessarily, but will give us enough reports prepared by competent men to enable us to know the trend from year to year.

Last year, as I have said, we spent $25,000 for that work.

The purpose is to increase that appropriation by $70,000, to endeavor to build up a more extensive reporting system, to be checked by trained men. One supervisor here to start with, four regional supervisors who will be traveling most of the time and gathering information from every source, which from experience they are led to believe will be reliable.

As time goes on I think we must unquestionably spend considerably more money than we are asking for now. But we have asked for what we believe to be the minimum to enable us to start a really dependable organization for that work.

Our estimate on that to start with was: One livestock supervisor, 4 regional supervisors, and 14 statisticians, and we expected to spend between $18,000 and $20,000 for travel for those men.

In the States east of the Missouri and part of them west of it we can build up a very good organization through volunteer reporters, as we have with the crop statistics. But when we get into the range country mail reports are not very satisfactory. Reports of that country have got to be gathered also by men who are traveling through it.

I shall not undertake to tell you just in detail how we expect to spend that money; in fact, we can not say in advance. The purpose is to build an organization that will get us results, and that can not be done in advance; it has got to build as you go along. We have asked here for enough to enable us to make a really good start on it, and that is all.

Mr. **Buchanan**. Speaking of giving the trend of the live-stock industry, do you mean the trend as to whether the number is increasing or decreasing, or in what respect?

Secretary **Wallace**. Yes.

Mr. **Buchanan**. Just increasing or decreasing?

Secretary **Wallace**. That is one of the things, yes; the differences in the methods of the marketing, age at which the animal is marketed, the movement to and from markets; for instance, in the case of feeding cattle we have got to have better information on that; the movement of feeding cattle into the country for feeding purposes, and analysis of the whole live-stock industry, with the point in view of knowing exactly what we are doing in the way of production and in the way of marketing.

Mr. **Wason**. Will that benefit the individual cattle grower much, Mr. Secretary?

Secretary **Wallace**. We feel it would, yes, very much.

Mr. **Wason**. Will not the big stockyards still control the price and take advantage of your statistics fully as completely as the grower of the stock can, or more so?

Secretary **Wallace**. There is no way to make the statistics available to the man in the country and not to the man in the city, and I do not think it would be desirable if there were. The difficulty is now that there are too many men who are not producers who have information infinitely superior to the information the producer has.

Mr. Wason. That is so.

Secretary Wallace. And the whole purpose of this is to get, thoroughly and reliably, information and make it available to the men who produce as well as to the others.

Mr. Wason. The Secretary said he wanted to make a general statement, Mr. Chairman. Is he ready to make it now?

Secretary Wallace. If you do not mind, I would rather make a general statement after you work through the mass of this, some time at your convenience. Of course, I am willing to suit myself to your convenience.

Mr. Anderson. We will be glad to have you come at any time you can, Mr. Secretary.

Secretary Wallace. I was very anxious to say something about these important items. I feel they are absolutely vital to us. We simply must have more information, both on the grains and on the live stock. We must know what our competitors in foreign lands are doing, and we must know conditions which affect consumption in importing countries, and we must especially know what we are doing here in live-stock production, because that affects not only the price of live stock but it affects the price of the grain. Eighty per cent of our grain is fed to our live stock—the heavier or coarser grains—and every little variation in live-stock production may have a very pronounced effect on the price of such grain as corn, for example, for the market price is made very largely by the 20 per cent which goes to the market.

Mr. Buchanan. And the reverse is true?

Secretary Wallace. And the reverse is true, yes.

Mr. Anderson. If there are no further questions, we are very much obliged, Mr. Secretary, and will be glad to have you come back whenever convenient and make your general statement.

Dr. Taylor, do you wish to give us some details on this item?

Dr. Taylor. The plan has been for Dr. Estabrook to give any further details that you want on both of these items.

STUDIES IN FOREIGN PRODUCTION OF AND DEMAND FOR AGRICULTURAL PRODUCTS, ETC.

Mr. Anderson. Very well. Dr. Estabrook, will you tell us something about the organization which is proposed under the item on page 223, for collecting and disseminating to American producers and others information relative to the world's production of and need for agricultural products, and so on, knowledge of which is necessary to the guidance of American production and the advantageous disposition of farm products in foreign countries, etc.?

ACTIVITIES OF SPECIALISTS AND EXPERTS IN EUROPE.

Mr. Estabrook. This project is a continuation of a project that had been started in a small way prior to the beginning of the present fiscal year. We had at that time two men abroad—one at Buenos Aires, Mr. Bullock, and one at London, Mr. Foley. Beginning with July 1 of the present fiscal year, we had available for the first time

$50,000 which Congress appropriated last year. We have expanded this work both by increasing the duties of the two men we already had, and by sending some additional men to Europe.

Mr. **Anderson**. Were those two men permanently stationed over there?

Mr. **Estabrook**. They were; that is, Mr. Foley has been at London for two or three years and Mr. Bullock has been in South America for a year and a half or two years.

We employed along in the summer months a specialist on meat and live-stock production, Mr. Squire. He was sent to Western Europe, with headquarters at London.

Mr. Squire had experience as selling agent for one of the independent packers since the signing of the armistice, so that he already knew the situation over there fairly well and what contacts to make and how to make them, and was ready to start right off in making special investigations for our department. He has uncovered a great deal of very valuable information. He made a special study of the Danish bacon situation, for instance; he has sent over a great deal of information about the prices for American meats in comparison with the prices for the Irish and Danish bacon, dairy products and poultry products. He has made a special study on meats and market prospects for meats in Germany, and is sending an increasing volume of information regarding the meat situation in Western Europe. That material we are trying to get before the public as rapidly and as widely as possible.

In addition to Mr. Squire, the meat specialist, we have a man in the Balkan States, Mr. Michaels, a man who had had a number of years' experience in Russia and in the Balkan States. He has made a special study of the grain situation and prepared a very valuable report, including an estimate of the probable surplus bread grains in Rumania and the adjoining countries, which has been given wide publicity.

In addition to the four men I have mentioned, some of our cotton men went over at the beginning of the fiscal year. Mr. Morrill has already told you of his visit to the world's cotton conference with Mr. Meadows, and their trip to Milan, Italy, in connection with cotton standards.

Following that trip to Milan, Mr. Meadows and Mr. Pryor, our cotton statistician at that time, visited practically every cotton milling center of Europe and made a very thorough investigation of what they were doing and what the prospect was for using additional quantities of American cotton. They got as far as Egypt and made some investigations of the cotton situation in that country. They submitted a very complete and exhaustive report.

In addition to those cotton studies, two other men were sent over in the autumn—Dr. Warren, of Cornell, and Mr. Callander, of our bureau—to make a survey of market conditions and prospects, and especially a survey of the sources of statistical information. They visited all the departments of agriculture and the statistical departments of practically every country in western Europe to ascertain how they collect their information, time of issuance of reports, and degree of dependability; also to arrange with these departments for the prompt exchange of crop information; also to formulate, so far as they could, a definite program for the kind of organization which we might set up in Europe which would be most effective and most economical.

Just this morning I have a report from Dr. Warren on that point. He recommends, in brief, the employment of two additional commodity men in Europe—that is, we now have this meat commodity man. Dr. Warren thinks we should have also a man on cotton, and a man on grain—men who will study the trade practices, the consumption and demand for these products, factors affecting demand, such as financial conditions and purchasing power, and, so far as they can, make known to the foreign trade what our official standards and grades are.

In addition to the commodity specialists, Dr. Warren recommends what we have already had in mind, namely, the establishment in the principal countries of the world of what might be called "agricultural attachés," the kind of men the Secretary of Agriculture mentioned awhile ago, men thoroughly versed in the economics of agriculture, men with an agricultural background, whose function it would be to obtain all the latest available information with respect to crop and live-stock production in his country, all the information that he could gather respecting the consumption and probable demand, stocks on hand, surpluses and deficits, and also to facilitate the prompt transmission of official estimates prepared by the various governments.

We get all official estimates at the present time, but in many cases there are serious delays; some of the information is all the way from six weeks to six months in reaching us.

If we had a man in those countries who was in close contact with the statistical departments, he could obtain the reports as soon as prepared, often before they are published, and could cable us the essential features of those reports, and we would have them promptly instead of waiting for the rather slow process of getting information through the Agricultural Institute or waiting for the Government itself to mail the reports. These attachés would also be expected to cable any material change in crop or market prospects occurring between dates of regular official reports.

Mr. ANDERSON. Are these specialists kept in Europe all the time?

Mr. ESTABROOK. The men who correspond with what we term "agricultural attachés" would probably be there all the time; that is, they would be stationed in a country for a term of years at least.

Mr. ANDERSON. What does it cost for the salary and traveling expenses and maintenance of a man to do this kind of work abroad?

Mr. ESTABROOK. Roughly—it is merely an estimate, of course—the salaries of the kind of men we want would probably be around $4,000. It would depend somewhat on the individual, on his experience, on his training, his age, and his qualifications. It might range from $3,500 to $4,500—more likely it would be $4,500, if we could get the type of man we would like to have. His travel would probably cost around $1,500 a year. We would expect him to be located usually at the capital or the metropolis of a country. He would have to have an office, and probably have to pay office rent. That might range from $500 to $1,000 a year. He should by all means have a competent clerk, some one to handle his correspondence and be in charge of the office when the agricultural attaché is traveling, so that all the information that heads into that office can be promptly transmitted to the department here without delay. A competent clerk would cost, say, around $1,500, at least.

Then, in many countries, he would probably have to employ interpreters at times. Just what that would cost, it is hard to say, possibly $500 a year—$500 to $1,000; and there would necessarily be expenses for telegraphing, for cabling, and some expense for equipment and current supplies, say another $1,000.

Mr. **Buchanan.** It would total about $10,000?

Mr. **Estabrook.** I would estimate roughly that about $10,000 would maintain one of these offices for a large country.

Mr. **Anderson.** And you think in addition to the maintenance of these attachés it would be necessary also to maintain these commodity specialists?

Mr. **Estabrook.** It seems desirable for some of the largest staple commodities. The commodity man need not necessarily be a permanent man. If we have the attaché stationed there permanently, the commodity man might go over there for a tour of duty of, say, six months, a year or 18 months, as the case might be, and then return to this country. We would utilize, of course, these attachés that we have.

Mr. **Anderson.** Is your plan sufficiently mature now so that you can tell us how many and where you expect to have these attachés, and these other people?

Mr. **Estabrook.** Dr. Warren has included in his statement a list of about 17 which I think is a fair one.

Mr. **Anderson.** I do not want some utopian scheme that you eventually expect to spend $200,000 or $300,000 on, but what I want to know is what do you expect to do with $65,000?

NEED OF ADDITIONAL MEN ABROAD.

Mr. **Estabrook.** With the $65,000, which is an increase of $15,000, we can only hope to add not more than two additional permanent men.

Mt. **Buchanan.** You meant offices?

Mt. **Estabrook.** Yes. We now have an office at Buenos Aires in the Argentine; and one at London, with the two men—Mt. Foley, who would correspond with our agricultural attaché, and Mr. Squire, the commodity specialist on meats. Also a man in the Balkan States. There are three offices and four men which are permanently doing this work.

These four men are costing approximately $40,000 a year. The other $10,000 of this $50,000 appropriation will be used up in these special investigations that have been made, or will be made before the close of the year.

With the $15,000 additional, I do not see that we can add at the very most more than two additional permanent men.

Mr. **Anderson.** Where would they probably be located?

Mt. **Estabrook.** We would probably put one at Berlin to keep an eye on developments in Germany and in the adjoining countries. Personally, I should like to see the other man placed in Australia, because Australia is a competing country, and crop conditions there have quite an influence on our prices here. We have no representative there, and it is extremely difficult to get information. For instance, I had a letter within the past three weeks from an old acquaintance, a former employee of the department, who is working for a grain firm at Winnipeg. He wrote me that his firm had inside information that the average yield per acre of wheat in Australia this year was only 12 bushels instead of the official estimate of 14 bushels. If that is so, it is important that we should know it. We have no means of getting that information.

Mr. **Anderson**. Are your permanent offices now located at London?

Mr. **Estabrook**. At London and Buenos Aires, and the man in the Balkans is at Bucharest.

DUTIES AND ACTIVITIES OF SPECIAL AGENTS ABROAD.

Mr. **Buchanan**. You have had these offices located in these countries for some time. Have you had any other results from them than imparting to you the information as to the production in these countries? Have any other results flowed from these activities over there?

Mr. **Estabrook**. In the case of Argentina, Mr. Bullock was sent there primarily to encourage trade in pure-bred American live stock. On July 1, when our bureaus were combined and the work was redirected somewhat, we wrote him detailed instruction as to what we would like to have him do as an agricultural attaché; that is, not only pay attention to the demand in that country for pure-bred American live stock, but also to pay attention to crop production, to at once get in touch with the Argentine Department of Agriculture and its bureau of statistics, which corresponds to our crop-estimating bureau here; to get their crop and live-stock reports as soon as prepared and send them by mail to us, and if there is anything important to cable the information to us. For instance, it happened this last autumn, that we greatly desired to know what the new fall-sown acreage of wheat in Argentina was, the autumn being their planting season. We communicated with Mr. Bullock and in due time we had the official figures of the Argentina Government as to the newly-sown wheat crop. Mr. Bullock has also sent in a great deal of information abou farm and trade methods and practices and about the trend of business in Argentina, how their exchange rates are going and their exports of agricultural products—information which has a value in its bearing on trade conditions in this country.

Mr. **Buchanan**. My question is directed more to whether or not they increased our foreign commerce. I think that is of more importance than knowing the condition there—to increase our commerce in agricultural products. Do they do that to any extent?

Mr. **Estabrook**. As to whether they stimulate trade in our products?

Mr. **Buchanan**. Yes; as to whether they stimulate the purchase of our products.

Mr. **Estabrook**. So far as this was practicable, I would expect these gentlemen——

Mr. **Buchanan**. What is your experience with them? You have already had them.

Mr. **Estabrook**. Our man at London has sent over information regarding the condition on arrival of American shipments of fruits and things of that kind, which has been transmitted back to the various organizations in this country, and we believe has helped them expand their trade somewhat. Mr. Squire has sent over lists of representatives of foreign firms who wanted to be placed in contact with American firms having meat and other live-stock products for sale.

Mr. BUCHANAN. Then, as I understand it, these people are not in any sense commercial agents for agricultural products, but investigators to find actual conditions there and inform the department here, and the department in turn disseminates that information to the American people?

Mr. ESTABROOK. Yes; particularly——

Mr. BUCHANAN (interposing). That constitutes the whole scope of their duties?

Mr. ESTABROOK. Their first duty, as I see it, is to get prompt, accurate, and essential information, so far as it is obtainable, as to the production and stocks on hand which have a direct bearing on supply and demand throughout the world. We see prices of grain and cotton fluctuating from day to day and from hour to hour on our boards of trade and exchanges, the reason given being that "it is rumored"——

Mr. BUCHANAN (interposing). What results did you get in London?

Mr. ESTABROOK. Our agent in London does not get production figures. He is looking after the movements of American products through that great market, one of the greatest of all markets in the world.

Mr. BUCHANAN. I have no doubt about that—"greatest of all markets in the world."

Mr. ESTABROOK. He is getting information on the stocks on hand and the stocks afloat, prices and movement, consumption and demand, trade practices, customs, and requirements. He has unearthed something that we did not know before, and very few Americans know it, and that is the many trade bulletins or sheets that are prepared by agencies in London, Liverpool, and Manchester, which have a very limited circulation, on cotton, wool, meats, tobacco, grain, fruits, dairy products, and things of that kind; sheets that show from week to week and almost from day to day the quantity of these commodities that are afloat throughout the world, the quantities of these commodities that are arriving from day to day at great ports of entry, and information of that kind which has not been generally accessible to the trade in that country. Mr. Foley has, through persistent inquiry, ascertained that such trade sheets were being made up and are available, and he has arranged to have them come steadily to our department.

Mr. BUCHANAN. If those trade sheets are accurate they will be practically all you wanted?

Mr. ESTABROOK. Not necessarily. They give——

Mr. BUCHANAN (continuing). On cotton, wool, and meats whichever they cover.

Mr. ESTABROOK. They give a portion of the information we need.

Mr. BUCHANAN. Not all, I suppose, but cotton and wool.

Mr. ESTABROOK. Not all of them. There is no place in the world, no office in the world, that has complete information on any commodity, and it is our endeavor to improve that situation so far as we can.

We expect these agricultural attachés to make up a schedule of every official and unofficial publication on crop production, live-stock production, stocks on hand, consumption, surpluses and deficits, imports and exports, and prices that are published in those countries; and to make it their business to see that those reports are sent to the Department of Agriculture here as soon as available.

We expect them to cooperate with and obtain the cooperation of the American consuls throughout the world, and of the commercial attachés, because all of these men need a certain amount of direction and need a certain amount of instructions as to what to look for, so that the usefulness of our man would be multiplied many times by his cooperation with these other agencies.

STATE AND COMMERCE DEPARTMENTS DOING SIMILAR WORK.

Mr. **Buchanan**. The question that has been in my mind is "You have three different governmental departments here in Washington having representatives in foreign countries, and each one has a particular part of one big problem to perform."

Mr. **Estabrook**. Yes.

Mr. **Buchanan**. And the question is if it could be so consolidated into one organization and perform the entire problem, instead of having one to perform one part of it, and another to perform another part of it, and still another perform another part of it, necessarily there being some lack of complete cooperation. By them, separated as they are, in different departments of the Government and working under different heads; and it presents on the whole a rather unsatisfactory condition. I am not criticising any one department, you understand, but just simply the system. You want information on agricultural production and ask for agricultural attachés for that purpose; the Commerce Department are after increased business and they have commercial attachés to report on manufactured products; then there are the State Department Consular Service attachés——

Mr. **Estabrook** (interposing). And the military attachés and the naval attachés.

Mr. **Buchanan**. I have not mixed the military up in the civil life at all, and do not intend to; they have always been antagonistic—I do not mean in this country—throughout the history of the world.

Mr. **Anderson**. Is there any advantage in having these representatives officially attached to the embassies?

Mr. **Estabrook**. They tell me there is some advantage. The fact that they are attached to the embassy gives them entrée into certain official circles in each of these countries, where it is customary to stand more on their dignity than it is in the United States; in other words, a man who is attached to the embassy, under the official etiquette which obtains, can deal directly with foreign officials; and so the agricultural attaché would have the right to go directly to the minister of agriculture to get information. He would not have that right if he was not attached to an embassy; he would have to obtain information through the ambassador.

Mr. **Anderson**. Is this man you have in London attached to the embassy over there?

Mr. **Estabrook**. He is not at the present time, although we have recommended within the past month that both the men at London and the man at Buenos Ayres be made agricultural attachés.

In the case of the London man, he has practically all of the privileges of the official title because he rooms at the embassy. He is associated with the American ambassador, but he himself has raised the point a number of times that the commercial attaché has certain facilities that he has not by reason of the fact that he was not officially connected with the embassy.

Mr. **Anderson**. He does not have diplomatic immunity, I suppose.

Mr. **Estabrook**. No.

Mr. **Anderson**. Is there any reason why these people should not be attached to the embassy?

Mr. **Estabrook**. None that I know of. I see no reason why they should not be attached to the embassy and have the advantage, whatever it is, of free entrée into the official circles.

Mr. **Anderson**. What is the attitude of the State Department with reference to attaching them to the embassy?

Mr. **Estabrook**. They seem to be perfectly open-minded on the subject, and have raised no objection whatever in the case of these two men, whom we have asked to be designated as attachés.

Mr. **Anderson**. Have they designated them?

Mr. **Estabrook**. I do not know whether that has gone through or not; I could not answer that question now.

Mr. **Wason**. The fact that they have not been designated is not arousing any suspicion in your mind as to opposition?

Mr. **Estabrook**. Oh, no; the request was not sent over until the 8th of February.

Mr. **Estabrook**. I would rather have been surprised if the designation had been made by this time.

Mr. **Wason**. I remember at the time these special agents in the Department of Commerce were in Europe, the State Department was a little opposed to recognizing them.

Mr. **Estabrook**. Special agents?

Mr. **Wason**. Of the Department of Commerce.

Mr. **Estabrook**. Was there a feeling of rivalry between the two departments?

Mr. **Wason**. It is settled now.

Mr. **Buchanan**. It may be settled now. I was on the other committee, and I know both departments were before us in years gone by, and there has been a contest as to jurisdiction of these two departments, and both of them thought they ought to have it. That has been the condition heretofore between those two departments.

The consul's services apply to particular localities; a consul is located at a particular place, and there he stays; the commercial attaché in the Department of Commerce is a traveling man who goes from place to place seeking trade and ascertaining what styles of American manufactured goods are pleasing to the tastes, fashions, and customs of that country. But I think on the whole the commercial attachés have gotten a great deal of trade for American goods.

Mr. **Estabrook**. My thought is this: If we have a good, live, capable man in a country to represent American agriculture, it will be a part of his business to get full cooperation of the commercial attachés and the consuls that are in that country. They are all good Americans and are all sent over there for the purpose of looking after American interests. But we need the man with the agricultural viewpoint to get the kind of information we should have.

Mr. **Wason**. Does not that bring you right down to this: If there is a need there such as you describe, could not the man be appointed by the State Department, or by the Department of Commerce, with the approval of the State Department, and make his statistics available to everybody, including yourselves?

Mr. **Estabrook**. You mean obtain an agricultural man such as I have described?

Mr. **Wason**. Yes.

Mr. **Estabrook**. But place him with Commerce instead of with the Department of Agriculture; is that it?

Mr. **Wason**. I am not expressing any opinion. But I am familiar with the controversy I referred to, because I was on the committee that caused the disturbance in the House and brought to light an absolute duplication—the House committee did it; I did not do it. It seems to me that the Department of Commerce would be very jealous of your efforts. Do you know whether they are or not?

Dr. **Taylor**. I would like to speak to that point. Commencing last July, Dr. Klein and I have been getting together, and we have had a number of conferences. Once he brought a number of men over and we talked over the work that they could do for us; and we have worked on the hypothesis of getting the commercial attachés to do everything that they can possibly do for us, and on the principle that we would not do the things that they in their regular routine of work could do for us; and in this last summer when our men went to Europe they did a very great deal in the way of getting these attachés in touch with sources of information, so we could work through them and get the information flowing to us. As it is, as the work is now, we wish to build up a supplementary system to do the work that we can not get done by anyone else; and I think your suggestion is good, that the different men from America who are working in a given country need to know each other and need to understand what the other is doing, and in that way not duplicate each other's work. Our interest is in developing this work, to develop it in such a way that what we do will supplement the best we can get in the way of agricultural information from these other sources.

Mr. **Wason**. Will not the department get the best service if these men, whatever you call them, are responsible to one head, let the State Department, Commerce, and Agriculture each outline what activity or investigation of statistics they want returned to them through, for instance, let us say, the State Department? That is the way the Department of Commerce is getting most of hers now.

Dr. **Taylor**. It is a universal principle that has been demonstrated by history that the one who holds the purse string rules the world. The one paying those people determines what they will get, and the reason we want to pay their salaries and control these attachés is in order that we may be sure of getting information that is of greatest importance to American agriculture.

Mr. **Wason**. Even if there is a duplication of service?

Dr. **Taylor**. We want to avoid duplication of service, and that is one of the principles we have kept clearly in mind all the time, and in asking for this limited sum of money we have kept in mind getting everything possible from the other sources and using this fund for supplementing the information that can be gotten from these other sources.

With regard to the development that should take place with reference to unifying this work in the future—that is, all of this foreign work—I, of course, have nothing to say. That is a question for others to settle. But for the present this is the way it is organized: We need this sum of money in order to supplement the work others are doing in such a way as to get the information, and particularly at this time when the problem of marketing our goods in foreign countries is such a serious one and where the changing conditions over there are making it so difficult for farmers to know how to adjust their production to those changed conditions. Just take eastern Europe at the present time; the rapidity with which that part of eastern Europe which formerly produced a surplus of wheat and put it on the western European market, comes back into production and produces a surplus is a matter of vast importance not only to the wheat growers but to all grain producers of the United States.

Mr. WASON. In view of the Secretary's statement a few months ago about his fears of foreign competition bringing foodstuffs into our markets by ocean steamers, do you not think that if he is accurate that our producers of the Middle West would be under great handicap in getting export goods to Europe?

Dr. TAYLOR. We are importing certain classes of products and exporting certain classes of products now, of course.

Mr. WASON. Then there is no competition really between the agricultural products of this country and the agricultural products of the importing countries.

Dr. TAYLOR. I would not say that at all. I would say that formerly the competition between our agriculture and foreign agriculture was largely in the surplus that we put into Western Europe in competition with the surplus that came from other countries. Now, we not only have that handicap, but the greater cost of getting our products into Europe, and we also have the further competition of foreign countries beginning to put their products in on our eastern coast at times and on the western coast, poultry products particularly, and products from the Argentine in the way of corn on the eastern coast.

Mr. WASON. Do not any meat products come from South America?

Dr. TAYLOR. At times.

Mr. ESTABROOK. These attachés would also be expected to collect a great deal of information not strictly relating to crop statistics, for instance, Europe is a laboratory of various experiments, you might say, in cooperative endeavor on the part of producers, cooperative credit, cooperative insurance, cooperative buying and cooperative selling. Then there are all forms of land tenure, division of large estates into small holdings, extensive and intensive systems of culture, and organization of agriculture. The question of taxation is a very important one. They have tried all sorts of taxation schemes.

Mr. BUCHANAN. We have enough of that now.

Mr. ESTABROOK (continuing). They have an important influence on the profitableness for unprofitableness of farming. If we had properly trained men in those countries they would be able to pick up a vast amount of information along these lines which would give us the benefit of foreign experience.

Mr. ESTABROOK. If the committee have no further questions to ask—I brought some samples along of some of the material that I mentioned. Here is a report from Mr. Squire on the Danish bacon, showing how it is displacing the American bacon Here is bulletin No. 987, "Handbook of Foreign Agricultural Statistics," in which we set out for each of the foreign countries their statistics of acreage and production and values for both crops and live-stock.

Mr. ANDERSON. That is a mere historical record?

Mr. ESTABROOK. That is a mere historical record; yes.

STATISTICS OF AGRICULTURAL PRODUCTION AND DISTRIBUTION.

Mr. ANDERSON. We will now take up the next item, on page 224, relating to crop estimates and live-stock statistics.

Mr. ESTABROOK. The next item is the second subject of which the Secretary spoke. This item covers the statistical service, what was the Bureau of Crop Estimates before it was combined with the Bureau Markets.

I presume the committee is familiar with the general nature of the work of the bureau. The fact is that the Crop Reporting Service has been developed through more than half a century, and it relates primarily to crops.

We have never had special funds available for estimating live stock. The estimating of live stock has been only incidental. As the Secretary pointed out, we have less than $25,000 available for that purpose. It has been our practice to estimate as best we could with those limited funds the number of animals on the farms in January of each year. We have been wholly unable to even attempt to estimate the number of animals on feed from time to time, or when they would be expected to go to the market or their average weight and condition. We have never attempted to estimate dairy production or poultry production, two industries which have an annual value of possibly $1,500,000,000 a year.

As the Secretary pointed out, the cash income of the farmers of the United States, is derived from live stock and crops in the proportion of 56 per cent for live stock and live-stock products, and 44 per cent for crops of various kinds.

We have a constant demand for detailed, specific information with respect to live stock, which we are wholly unable to meet, because we simply have not the funds or facilities for doing it.

I brought along, simply as an illustration of the need for live-stock data, the report of the Farmers' Live-Stock Marketing Committee of 15 of the American Farm Bureau Federation, which met last November, and among their recommendations is one to the effect that the Department of Agriculture should secure for them the number, sex, and age of the different classes of live stock, cattle, sheep and swine in the country periodically, the quantity of the above that is to be marketed at each principal market and the region from which it is to come; market receipts, with origin of same; and similar information for other live-stock markets covering various kinds, and classes of live stock, cattle, sheep and swine, together with their distribution into specific channels; and they recommend that all this information be collected by the Department of Agriculture.

Mr. WASON. Right on that point, supposing you had an organization set up to furnish you with those statistics so that you could make them public, can you tell the committee just what advantage that would be to a stock man and dairyman?

Mr. ESTABROOK. We assume that if we were in position to furnish detailed information which is dependable, showing the number of head of the different kinds of live stock, by age classifications and sex classifications, in each State and in each county; and if we could furnish statements at the proper seasons during the year of the number of head that were on feed, their condition and the approximate date when they would go to market, and their approximate weights when they are marketed, as we are absolutely certain we can do if we have the facilities; that any live-stock grower, whether in the range country or whether in the feeding sections, would be able to judge far more intelligently than he is now able to judge as to what the marketing prospects would be; whether it would pay him to arrange to market his surplus stock at a given time, or hold them for a later time. It ought to enable breeders to determine more intelligently than they can do now whether it is going to pay them to go ahead and enlarge their operations as time goes on, or whether they had better restrict their operations.

In other words, this information should be a guide to a production program, and it should be the best guide available for a marketing program.

Mr. WASON. It occurs to me that if I was growing live stock out West and I got that information from your department and I found that there was going to be a lot of stock shipped to the market about a given time, I would hold my own back and see if I could not get a little better price later or crowd mine and get them in earlier.

Mr. ESTABROOK. Yes.

Mr. WASON. That is what I would do and apprehend my competitors would be doing the same trick.

Mr. ESTABROOK. We would have a trained man who was keeping tab on what is happening in each of these principal States, and the moment he observed a slowing up in the movement to market that would be reported, and everyone would know what was going on, and you would certainly be in a position to act more intelligently.

Mr. WASON. And that would bring a lower quality of meat into consumption here in Washington?

Mr. ESTABROOK. It is almost fundamental that any business man needs all the information he can possibly get with respect to his product, in the production of it and in the marketing and distribution of it.

Mr. WASON. Do you think that you could advise the stock grower so that you could keep comparatively an even flow of beeves to the great market centers?

Mr. ESTABROOK. Our particular purpose would not be to advise the stock grower what to do, but to supply him with the facts which would enable him to make an intelligent judgment himself as to what he ought to do. But in a large way the live stock men are organized, and it is assumed that if we can place in the hands of the officers of their organizations sufficiently dependable data upon which they can rely, that they will know what to do with it after they get it.

Mr. WASON. And will that information you gather here in this country be coupled with information from countries of South America, controlled by the packers in regard to beeves grown there, so that they could not still cause the market to fluctuate to the disadvantage of the western stock grower?

Mr. ESTABROOK. There is where our project of foreign competition and demand hooks up with our service here.

Mr. WASON. I know it hooks up, but it is results here I am thinking of, whether the interlocking will be beneficial or whether it will be a lock that the packers will still be enabled to unlock. You know they are experts with the key.

Mr. ESTABROOK. That is quite true, and they appreciate the value of definite, detailed information so highly that they do not hesitate to spend money freely to get it.

Our whole endeavor is first of all to get the facts and then to publish them as quickly and widely as possible. Our bureau is an information collecting agency, and it is an agency for the benefit of all the people.

Mr. WASON. Except the packers, because they get it now.

Mr. ESTABROOK. They have that advantage at the present time over producers and the public generally.

Mr. ANDERSON. I think you are overestimating the amount of information the packers have about some of these things.

Mr. WASON. I hope so.

Mr. ANDERSON. We have been trying to get some from them lately. [Laughter.]

Mr. WASON. You have not got the key.

Mr. ANDERSON. All they had, apparently, was what they got from the Department of Agriculture.

Mr. WASON. They are shrewd fellows.

Mr. ESTABROOK. But it is our thought, that having developed a crop-reporting service with some success, a somewhat similar service ought to be highly desirable for the live-stock industry which, as the Secretary said, is perhaps the greatest single industry there is.

Mr. WASON. What was going through my mind was, whether or no when that information is obtained in the scope that you have in mind, it is going to be of any material value in dollars and cents to the big cattle grower out West beyond the Mississippi Valley.

Mr. BUCHANAN. Do you mean the little one, too?

Mr. WASON. That is what is bothering me.

Mr. ESTABROOK. It is quite evident that many of the individual live-stock growers feel that such information would be of value to them, because they ask for it now, and we are unable to give it to them; certainly the live-stock organizations and certainly the farmers' organizations feel they need this information, and I think they will know how to make good use of it when it is available.

Mr. WASON. They are in distress and have been in distress for years, and when a person is in distress he will turn to every avenue to get relief. Now, then, this information is not going to control the packers and the stock yards from fixing the price of beef going into the market, no matter how complete the knowledge of the stock grower is.

Mr. ANDERSON. We are going to organize these producers so that they can make use of this information.

Mr. WASON. Well, sir; you have my good will and help, and I will work as long as any of you. But I am a little dubious about it, and I wanted to see if I could get any clearer information.

Mr. **Estabrook**. One thought in connection with this live-stock project might be mentioned, and that is it is almost useless for any single State to attempt to develop a service, or for any local organization to attempt to develop such a service, because in the main it is a country-wide proposition, and it is only the Federal Government which could hope to develop a satisfactory system.

FOR EMPLOYMENT OF LIVE-STOCK SPECIALISTS.

Mr. **Anderson**. Have you in mind the plan of organization that you expect to adopt?

Mr. **Estabrook**. With this $70,000 increase which we are asking we would expect to employ about 14 live-stock specialists at salaries around $2,500, I would say, to begin with; 4 regional supervisors located in the field, and 1 general supervisor, with headquarters in Washington, to head up the work.

We have found in our efforts to obtain information by means of printed schedules which worked out pretty well for crops, that outside of the corn-belt region we are not very successful in getting replies. Men in the range country will not fill out schedules, so that it is necessary to have men in that country who are devoting practically their entire time to checking up the live stock with the live-stock men, getting their cooperation, getting them to pool their information, and in that way getting a better line on what is coming out of the range country. That, in a general way, is the organization—14 live-stock specialists, 4 regional supervisors, 1 general supervisor, which would cost around $51,000 for salaries.

Mr. **Anderson**. Who are these specialists going to get their information from? They have got to get if from somebody.

Mr. **Estabrook**. They will get it from all sorts of people; they will gather it from every available source of information. They will utilize county agents so far as practicable; they will get in touch with the officers of every local, State, and national live-stock association of every description and get their cooperation in filling out schedules. They will visit the big fellows and get information from them by interviews so far as they can. They will be checking up all the time on assessor's returns, because there is some valuable information in them. It will be a combination of getting information on printed schedules from selected lists of reporters, personal travel, personal inspection of field conditions, and cooperation with the best-informed men in each locality and with organizations of producers and shippers.

TRANSFER OF FUNDS.

Mr. **Anderson**. In this statement you apparently arrive at an increase of $107,600. The clerk and I have been going over this a little bit and our arithmetic makes it $147,600. There is $40,000 increase in the amount. And there are transferred to a separate item $50,000 carried in a proviso.

Mr. **Estabrook**. Yes.

Mr. **Anderson**. And there are 32 employees, with salaries aggregating $37,600, transferred to the statutory roll; then there is $20,000 more allotted to this appropriation from the appropriation for marketing and distribution of farm products.

That makes a total increase of $147,600, even if it be assumed that the work formerly done under the marketing and distributing appropriation of $20,000 is continued under this item it would still be an increase of $127,600.

Mr. ESTABROOK. When the two bureaus were consolidated on July 1, last, we started out with an appropriation of $300,000 for statistical work, of which $50,000 is set aside for the foreign work, leaving $250,000 for the crop reporting and statistical work. There was in the Bureau of Markets a little division called the "Division of Marketing Statistics," with an allotment of funds from the marketing and distributing item of $20,000. That was combined and consolidated with our statistical force, so that this year at the present time our allotment of funds is $250,000, plus this $20,000, or $270,000, which is the present cost of the work. In addition to that, we are asking for this increase of $70,000 for live-stock work, which makes the total amount $340,000. It is a net increase of $70,000.

Mr. ANDERSON. I do not care whether it is your own work or not. What I want to know is, how much money it is, whether one piece of work or another piece of work, if it is an increase of $147,000, that is what it is.

Mr. ESTABROOK. We have now $270,000; we are asking for $340,000 which is an increase of $70,000.

Mr. ANDERSON. Where do you get it? You have juggled these appropriations around so that nobody knows anything about it. It does not make any difference what we appropriate for, when you get through with them you have got whatever you want. If there is any language that we can put in here that will make these appropriations stay put, I wish I could find it out.

Mr. ESTABROOK. I have not the wording before me, Mr. Chairman; but our appropriation now is $300,000, less $50,000 for new work.

Mr. ANDERSON. That gives you $250,000 for this job, and you go and take $20,000 off of some other job and put it over here.

Dr. TAYLOR. And take another task also.

Mr. ANDERSON. All of which goes to show that it does not make any difference what we appropriate for here, or what we put in this bill, the amount which you spend is the amount which you can get from some place, whether it is in this amount or not.

Dr. TAYLOR. Yes; but it is not being spent for crop estimates, and in the reorganization of the bureau we were trying to get greater efficiency in statistical work by having this section on market-price statistics associated with this other work; and in the estimates this year not only the work of the Bureau of Crop Estimates but the statistical work in the Bureau of Markets is combined in this item.

Mr. BUCHANAN. You took over the appropriation and the work?

Dr. TAYLOR. Yes.

Mr. BUCHANAN. And I suppose the personnel?

Dr. TAYLOR. Yes; going right ahead.

Mr. BUCHANAN. Instead of having it under two heads you have it under one head?

Mr. ESTABROOK. Just what happened was this: The head of the Market Statistics Section was detailed to other work, and without getting a new head we simply put that section in with the other statistical work under the head of the other division.

Mr. Anderson. If you can fix these items up in some way so we can understand it, we will be glad to have you do it.

Dr. Taylor. We will be glad to have it done, and a statement inserted in the record.

EXPLANATION OF THE INCREASE UNDER THE ITEM FOR CROP AND LIVE-STOCK ESTIMATES.

The appropriation for the current year is $300,000, but a proviso is attached which sets aside $50,000 of this amount to be used in a foreign-marketing service, leaving but $250,000 for the crop reporting and statistical work. We are, however, using $20,000 from the appropriation for marketing and distributing farm products for statistical work and have united this amount with the $250,000 shown above, thus making a total of $270,000, which is being used at the present time. In the estimates we are asking for a lump fund of $340,000, which is an increase of $70,000 over the lump-fund amount being used at the present time. Add to this increase the sum of the transfers of positions from the lump fund to the statutory roll, i. e., $37,600, and the total actual increase requested for the work will be $107,600, or the amount shown in the printed estimates.

Mr. Anderson. We will now take up the item in page 226——

Mr. Buchanan (interposing). Mr. Chairman, before you get to that I do not care anything about the item of $50,000, but the idea is, as I understand it, that it shall be used for collecting and disseminating to American producers, importers, exporters, and other interested persons information relative to the world supply of and need for American agricultural products?

Mr. Anderson. That is put over in a separate item on a preceding page.

Mr. Wason. On that same page I see new language "on farms." Is that so you can make a comprehensive survey?

Mr. Estabrook. Yes; to ascertain the value of live stock and live-stock products without limiting it to farms.

Mr. Wason. That would give you the right to go into cold storage and such places?

Mr. Estabrook. Well, it would enable us to get statistics on crops and live stock and live-stock products wherever they might be.

Mr. Wason. That is your purpose?

Mr. Estabrook. Yes.

STUDY OF GEOGRAPHIC BASIS OF AGRICULTURAL PRODUCTION, ETC.

Dr. Taylor. The item on page 226 consists of three parts, and they are a part of the lump-sum appropriated for Farm Management and Farm Economics. The first item is for the study of the geographic basis of agricultural production, and I will ask Dr. Baker to state briefly the work that is being done.

Saturday, February 11, 1922.

Dr. Baker. This work has been a separate section of the Office of Farm Management for nine years. I presume the words "geography" and "history" sound to you rather academic and remote from the farm. In reality our work is scarcely at all academic, and it is very closely related to our agricultural progress. Our function is twofold.

Our first function is frankly educational; that is, we are trying to assemble and present, by means of maps, graphs, and written text, all sorts of facts gathered from our own bureau and other bureaus in the department. May I say that this is a broad, cooperative undertaking and has involved practically every bureau in the Department of Agriculture and even some bureaus outside, especially the Geological Survey.

I have here some maps and graphs which have been published in sections of the Atlas of American Agriculture, in a small hand atlas called "The Geography of the World's Agriculture," and in various bulletins and yearbook articles. With your permission, I shall be glad to show you a few of these. These are my own personal copies, Mr. Chairman. The supply for distribution, I may say, has been completely exhausted.

The "Geography of the World's Agriculture," which is the one you have, has gone into its fourth edition during three years. The Printing Office 'phoned this morning that this book probably had a wider circulation at $1 per copy than any other Government publication in recent years.

Mr. ANDERSON Has it been printed by the Government?

Dr. BAKER. Yes, by the superintendent of documents. It has been republished three times.

These publications have found greatest use in the agricultural colleges and county high schools, in normal schools, and in our larger universities. The Year Book Separate entitled "Graphic Summary of American Agriculture" has been purchased by the students of the University of Chicago at the rate of over 1,000 copies per year. There are fully a dozen of the large universities, and more agricultural colleges, besides many normal and high schools, who are using these publications either as textbooks or for supplementary reading.

Mr. ANDERSON. How often is this atlas gotten out?

Dr. BAKER. The Atlas of American Agriculture has been issued in sections, the "Frost" and "Cotton" sections in 1918, "Rural Population" in 1919. This Geography of the World's Agriculture was gotten out in 1917. It was based largely on data gathered by the census of 1910. It is our intention to bring out a revision based on the new 1920 census data and data gathered by the Bureau of Markets and Crop Estimates, and other statistical agencies.

Mr. ANDERSON. How long will it take to get that out?

Dr. BAKER. We are now planning to use the large size atlas to describe the climate, soil, and other basic physical conditions, which can be portrayed only by colored maps and are permanent, and hereafter to issue the crop and live-stock maps in the smaller size, like the "Geography of the World's Agriculture." We were starting to prepare such a publication when we were diverted to the Yearbook work. The Yearbook for 1921 is to be of a different character than heretofore; it will be devoted largely to a study of economic conditions in the corn belt, the cotton belt, and the wheat region. Owing to the graphic method of presentation, the preparation of a large part of the Yearbook has devolved upon our office. As soon as the Yearbook is out—and that will be a month or two—we will resume work on the "Geography of American Agriculture."

I wish to emphasize the importance of this educational work. The world of affairs, especially in our country, is operated on a voluntary basis. This demands general intelligence among large numbers of people. The wisdom with which they act depends on the knowledge they possess, and it is much easier to teach the young than the old. What we are trying to do is to assemble the large amount of data published in statistical form and unpublished in our own bureaus, in other bureaus, and by the census, and present it in a form that is readily understood.

The second function of our work is interpretation. The reason we make maps and graphs is so that the conditions and relations may be more readily seen. Some facts when thus presented need no interpretation—they interpret themselves—but most economic situations are complex. So we endeavor, on the basis of geographic conditions—soil, climate, distance to market,etc.—and the historical trend of development—production, exports, prices, etc.—to interpret the facts from the economic point of view. The object of our work is to understand the trend of American agriculture, and to this extent anticipate the future, in order that the advice offered to farmers by our bureau may not be futile.

Now, there are three sections of our work. I might, by the way, note that in the projected new "Bureau of Agricultural Economics," it is proposed to call this section "Agricultural Readjustments." I think probably no two words could be better selected than these.

We are studying the readjustments in the systems of farming that are constantly necessary to meet changing economic conditions in one part or another of our country.

As I said a moment ago, there are three projects in this section. The first is the Geographic Basis of Agricultural Production; the second, Geography of Farm Practices and Types of Farming; and the third, The Historical Trends of Agricultural Organization, Production, and Prices.

COTTON SECTION.

The first project is engaged in studying the geographic basis of both our present and of our future agricultural production and distribution. The character of this work is illustrated by the cotton section of the atlas. May I remark that the Public Printer sold out his supply of this section within three months——

Mr. **Buchanan** (interposing). Is this one later [indicating] than that one?

Dr. **Baker**. They were published about the same time. The "geography" is a general survey of the crops and live stock of the world. This atlas section has reference to cotton alone. We took up cotton and studied it separately. We have two maps and——

Mr. **Buchanan** (interposing). What is that picture there [indicating]?

Dr. **Baker**. We show only the big areas of production. I think I have another copy here.

I may explain that in the cotton section we are dealing with four or five subjects. There is the introduction [indicating], describing the commercial varieties of cotton; on the next page we have attempted to provide detailed information with reference to climatic, soil, and other conditions in order to determine where cotton is best grown.

Mr. **Buchanan**. Do you give the area adaptable to the growing of cotton?

Dr. **Baker**. That is something problematical; it is more a question of labor than climate. The climatically potential production of cotton in the world is practically unlimited. Production is largely limited by labor. One of the reasons that we produce so much cotton in the South is the supply of labor under more excellent supervision than exists in tropical countries.

Mr. **Buchanan**. I doubt the statement that the potential production is unlimited.

Dr. **Baker**. Of course, nothing is unlimited. It is a matter also of competition with other crops.

Mr. **Buchanan**. In many countries it can be grown where they have cheap labor and the proper soil, but it is not a profitable business.

Dr. **Baker**. Yes; from the standpoint of profit undoubtedly America has an assured supremacy. The British Cotton Spinners' Association have been trying for 50 years to encourage its production within the Empire on a large scale, but they are producing no more now than they were years ago.

Mr. **Wason**. How far north can it be grown?

Dr. **Baker**. To-day it is grown in the mountains of Kentucky. During the Civil War several counties in Illinois reported the production of cotton. I might say that the trend of economic forces is to intensify the influences of geographic conditions. Instead of geographic conditions being diminished by economic progress, their control is being intensified. Cotton used to be grown up as far north as St. Louis, but as transportation facilities developed and as the world became better organized, it paid only to produce the cotton in the region in which it is produced most easily.

Mr. **Wason**. Have you in mind the approximate boundaries? Can it be grown successfully in Northern Pennsylvania?

Dr. **Baker**. I do not think it will mature there. During Civil War times they grew a very little in the Southern part of Pennsylvania. In George Washington's time it was grown along the Potomac above Alexandria.

The future agricultural production of the United States depends, in large part, upon the further extension of our arable area. The climate, soils, location with reference to markets, and other geographic conditions affecting the utilization of the cut-over, swamp, and arid, or semiarid regions are being mapped and studied from the economic point of view by this project, in collaboration with the Land Economic Section, the Weather Bureau, Soil Survey, Bureaus of Plant and Animal Industry, and the United States Geological Survey. Yearbook Separate No. 771, entitled "Arable Land in the United States" summarizes a phase of this work. At present this project is supervising, in collaboration with the bureaus mentioned, a survey of the best use of the land in different portions of the Great Plains region, where, owing to several wet followed by several dry years, problems of land utilization are very pressing.

We have taken the Great Plains area for special study because of the serious situation existing there, especially in the northern portion. The summer before last Dr. Marbut, of the Soil Survey, and I spent three months there studying conditions. This last summer we had a man out there studying the experience of the farmers. At present another section in the office is conducting an agricultural survey.

That is the work of our first project. It deals with the geographic basis of both present and future agricultural production and distribution in the United States.

GEOGRAPHY OF FARM PRACTICES AND TYPES OF FARMING.

With reference to the second project, geography of farm practices and Types of Farming, we are studying at present the cropping systems and farm practices of the cotton belt and the corn belt. Two bulletins descriptive of agriculture in these regions and suggesting more economical methods of farm organization will be submitted during the coming year. These bulletins will be of most value to teachers of farm management, to county agents, and to leading farmers in these regions. A former publication of this project has been handed to you. It is entitled "Farm Practices in Growing Wheat." and illustrates the character of this work.

STUDY IN SHIFTS OF AGRICULTURAL PRODUCTION AND SYSTEMS OF FARMING, ETC.

The third project is studying the shifts in agricultural production and systems of farming from one part of the country to another; also those changes that occur in the same locality during the course of time. Why, for instance, should wheat production in Wisconsin give way to dairying beginning about 1870, and move onward into the Northwest? A similar development began in California some 30 years later. Such shifts in systems of farming are like revolutions in political history. We are trying to study their causes, and determine the trend of agricultural development as population increases.

May I sum up now? Our work is to try to reach the colleges, high schools, normal schools, leaders in agriculture, with these publications, and to interpret for them the facts relating to the development of American agriculture. We attempt to interpret agricultural conditions from the standpoint of space, that is from the geographic standpoint, and from that of time, or the historical standpoint, and try in this way to get at the trend of things.

Mr. ANDERSON. How long were you on this?

Dr. BAKER. Since about 1912.

Mr. ANDERSON. You do not do the work of collecting these statistics?

Dr. BAKER. We depend on others to do that. There is a vast amount of statistics gathered by the Department of Agriculture and by the Census Bureau—far more than it has been attempted to interpret. But the man who sits down in an office chair and tries to understand conditions existing on the Great Plains, for instance, is making a mistake. We do our work in the field as well as in the office. Here [indicating] is some of the work done by the Weather Bureau in collaboration with us. We map statistics just as we map other conditions; then we interpret. The Weather Bureau provided the statistical data, then we collaborated in preparing the maps and wrote the text, endeavoring to take these data and put them in such form as would be helpful to the fruit grower, for instance.

In concluding, I want to say that our relations with other bureaus and departments have been extremely cordial. I have worked in several universities, and I do not believe that there is any university in which men have more cordial relations than in our department.

INVESTIGATION OF AGRICULTURAL CREDITS, STUDY OF FIRE, CROP, AND LIVE STOCK INSURANCE.

Mr. ANDERSON. Are there any further questions in connection with this item? If not, we will proceed to the next.

Dr. TAYLOR. Mr. Chairman, the next item relates to agricultural credits, the study of fire, crops, and live stock insurance, and taxation as they affect the business of farming. Mr. Valgren will tell you about that. He has given special attention to that subject.

Mr. VALGREN. Mr. Chairman and gentlemen of the committee, this division of which I have charge gives attention, as far as facilities and means permit, to credit, insurance, and taxation. That is the order in which we state out subject.

So far attention has been given almost entirely to credits and insurance. We have not succeeded in finding a suitable man to study problems of taxation as they affect the farmer. During the last year we made a special study of credit unions or credit associations which represent, as you know, a form of cooperation in the credit field.

This thing has taken hold in this country more in urban communities than in the country, but it is of considerable importance in connection with the credit status of the farmer, more particularly the small farmer, who does not have, at the present time, or does not utilize, banking connections.

I do not know that anything will be gained by taking up your time with that. We published the results of this study in a little circular which is known as Department Circular No. 197, and if any of you are interested in seeing a copy of it, I shall be glad to have you look at it.

Mr. ANDERSON. Are there any States in which farm credit unions are now legal?

Mr. VALGREN. There are now 11 States in which general laws have been passed for the organization and management and control of these associations. Those are shown on page 5 of this little circular. Since this was prepared, New Hampshire has adopted a law of this kind, following closely the suggested law that we have in the back part of the circular. At the present time there are bills introduced in the legislatures of Maryland and Kentucky providing for the organization and control of these credit associations.

Mr. ANDERSON. Are these credit associations usually unlimited liability associations?

Mr. VALGREN. No; limited liability.

Mr. ANDERSON. Do they have capital stock?

Mr. VALGREN. Yes; the general plan is capital stock of about $10 par value per share, or it may be $5. Of course, the laws of the different States stipulate usually the maximum or the minimum amount of shares.

Mr. ANDERSON. Do they accept deposits?

Mr. VALGREN. Yes. In most of the States they do. Unfortunately, in some of the States they have a provision in the law prohibiting taking deposits. That is one reason why no organization has been formed under the Nebraska law.

Mr. ANDERSON. Where they do not take deposits where do they get their credit?

Mr. Valgren. I do not know of any one that is operating in a State where it can not take deposits. They would get that from subscriptions to capital stock and also from the banks. As an example, take the organizations operating in North Carolina. They get their funds from subscriptions to stock and also from deposits. Then when these funds are insufficient to meet the demands for loans, they borrow from the banks on the notes of the association backed by the notes of the members in the association, deposited with the bank as collateral for the association's notes. In that way they have been able to obtain credit considerably cheaper than the individual farmer alone would be able to get it.

Mr. Anderson. Is there any liability on the part of the association except its liability on the capital stock?

Mr. Valgren. There is a double liability on the stock.

Mr. Anderson. Do the States put any limit on the amount which they may loan in relation to the capital stock?

Mr. Valgren. I have forgotten what the laws provide on that. There is a limit to the amount that they borrow. I am positive about that, but I do not remember the exact limit.

Mr. Anderson. Tell us what you do with respect to insurance.

Mr. Valgren. May I say another word on credits while we are on that subject?

Mr. Anderson. Yes.

STUDY OF PERSONAL AND COLLATERAL CREDIT TO FARMERS BY BANKS.

Mr. Valgren. Aside from this study of these credit unions to which I referred, we also made a study of personal and collateral credit to farmers by banks, a study which should be available very shortly. We sent back the page proof to the Government Printing Office two or three weeks ago. It should have been out by this time. In that we give an estimate of the total outstanding bank loans to farmers as of the first of last year, and the interest rates charged at the time of this inquiry, which was last April, and also the conditions attached to the loan which affect the cost to the farmer, such as interest in advance, or minimum deposits. We also show the variations in the demand for credit in so far as it is reflected by outstanding credit during the year. We asked the bankers of the country to give us the amount of loans to farmers on the last day of each month in the year and we had some rather interesting results, in my opinion, although it may be that last year was an abnormal year and that that particular thing will not be of more than passing interest.

Mr. Anderson. Did you get a response from the bankers to your questionnaire?

Mr. Valgren. We did not get as hearty a response as we had hoped for. We sent questionnaires to every banker in the country. The Treasury Department was kind enough to address those envelopes on their addressograph machine, so that it cost very little to send them out. We had replies from between 13,000 and 14,000. I will give you the exact number. We had replies from 13,140 banks.

Mr. Buchanan. Out of a total of how many?

Mr. Valgren. Out of a total of 30,178.

Mr. Anderson. Have you ever made any study of the amount of deposits contributed by farmers?

Mr. VALGREN. No; we have not. We have had various plans for trying to get it in local areas, but we have not done anything with it as yet.

We carried on simultaneously with this study a study of mortgage credit to farmers in the United States from the various leading sources, such as banks, in the first place, which constitute the biggest single source of mortgage credit as well as short-time credit. Then there are the life insurance companies. Of course, we got figures from the Federal farm loan and joint stock land banks and combined them with our figures, and we also got up to date figures from mortgage bankers and State agencies and State funds.

A few States, notably South Dakota and Oregon, have their own credit system, corresponding somewhat to the Federal farm loan system. The South Dakota system, I may say, has played an important part in that State, and they have provided farm mortgage loans to about $40,000,000.

Mr. BUCHANAN. And they are about to go "busted."

Mr. VALGREN. No; I think not. You are probably thinking of the North Dakota banking situation.

Mr. BUCHANAN. Perhaps I am.

Mr. VALGREN. The South Dakota system, so far as I know, is in a perfectly sound condition.

Mr. ANDERSON. Are you talking about long-time credit now?

Mr. VALGREN. Yes.

Mr. ANDERSON. I notice in these graphs that on page 5 there is shown an apparent increase in the total loans made to farmers during the period from January, 1920, to January, 1921?

Mr. VALGREN. Yes, sir.

Mr. ANDERSON. That bears out the impression I had with regard to that.

Mr. VALGREN. I may say that some of these figures are published in the second part of your report. We furnished them in advance to the joint commission.

Unless there are some questions on that mortgage proposition, I shall not say anything more with regard to it.

FARMERS COOPERATIVE OR MUTUAL FIRE AND CROP INSURANCE, ETC.

With regard to insurance, we have made a thorough study of farmers' cooperative or mutual fire insurance in the United States and we have furnished them with suggested organization and business forms which are being adopted. We also prepared a suggested set of books of record, of which they were very much in need. We suggested also a classification of farm property, which enables them, in so far as they adopt it, to charge rates which are more equitable as between one man and another and which also encourages the improvement of risks by recognizing in the charge the elimination of certain hazards, such as lightning, combustible roofs, and so on. For instance, if they put on noncombustible roofs, they get recognition in the rate.

Last year we made a special study of hail insurance in the United States. It was published in a bulletin the supply of which is nearly exhausted. I was told, in fact, that it had been exhausted, but I managed to secure a few copies.

Then we have just completed and had printed a summary of a study of crop insurance, that is, general crop insurance. We have only a limited amount of experience in this country on that subject, but is it a very important and a very interesting subject. I think that this bulletin, which came off the press on January 23, will be of considerable interest as summarizing experience and setting forth the problems and principles of general crop insurance, as we see them after a study of the question.

Mr. ANDERSON. Has there been any development in the direction of mutual hail insurance companies?

Mr. VALGREN. Yes; there has been considerable development. In fact, that is older than joint-stock insurance. Mutual hail insurance goes back to 1880, if I remember correctly, and for a time that was the only kind of hail insurance we had. But somewhere between 1880 and 1890—the dates are given in the bulletin; I do not remember them—joint-stock companies entered the field, and in recent years they have written approximately twice as much as the other companies.

Mr. ANDERSON. Do they write it in those sections where hail really occurs?

Mr. VALGREN. Yes; I am quite satisfied they do.

Mr. ANDERSON. I have heard it said that they do not. However, I do not know.

Mr. VALGREN. Until three years ago a great many of the companies that had been in the business for 20 years or more actually showed a loss; 1915 and 1916 were very bad years and wiped out the earnings that they had from earlier years. Of course, business had been increasing every year, so that one bad year would wipe out the profits of many earlier years.

Mr. ANDERSON. I suppose they didn't study the weather maps?

Mr. VALGREN. I think probably that is the explanation.

We show in this bulletin the actual amount of premiums collected each year by the joint stock companies and also the amount paid in losses each year. The gray line indicates premiums and the black line the losses during the year and, of course, these are the losses only, not the cost to the insurance companies, so that any year where that black line is upwards of three-quarters as long as the gray line the company had an actual loss.

Mr. ANDERSON. In 1915 they had an actual loss anyway?

Mr. VALGREN. Yes; they did. It was a hard year on the insurance companies.

There are also at the present time four States which write hail insurance through what is known as State funds or through State departments. North Dakota was the first State to inaugurate that in 1911. In 1917 Montana and Nebraska also adopted the State hail insurance laws, and South Dakota passed such a law in 1919. Oklahoma also adopted a law in 1919, although in that State, as I understand it, the law is practically dead. South Dakota has built up a large business and a material surplus.

Mr. ANDERSON. Are there any States in the crop insurance business?

Mr. VALGREN. Not in the general crop insurance business.

Mr. BUCHANAN. Are there any large companies?

Mr. VALGREN. There are two companies that have written it in the last two years, to my knowledge. Those companies are the Hartford of Hartford and the Home of New York, two of the biggest insurance companies in this country. The Hartford wrote a considerable amount in 1920, but lost heavily on the venture owing to the drop in prices.

Mr. ANDERSON. What is the basis of the rate?

Mr. VALGREN. The rate is arrived at from such information as the insurance company can get as to climatic conditions, soil conditions, and also the general crop average—the crop yield over a series of years. These rates vary, of course, materially.

Mr. ANDERSON. Do they insure for a fixed price, or do they insure on a basis of percentage of market price?

Mr. VALGREN. The Hartford Co. drew up its contract on the basis of guaranteeing the farmer a fixed income per acre, providing he went through all the process of tilling and harvesting his crops. That, of course, accounts for the loss which they sustained with the drop in prices.

The other company has a cautious contract which provides that if prices go up the amount due the insured shall not exceed the difference between the insurance on the face of the policy and the actual value of the crops, so that in case of a high price a relatively small yield may relieve them of indemnity. They also provide that in case of a drop in prices—they do not mention the drop in prices—but they say in no case shall the indemnity exceed what it would cost to replace the damaged crop with a crop of like quality. Those are the words in effect. Of course, I am not quoting exactly. So, under that contract——

Mr. ANDERSON (interposing). Do you have many inquiries in regard to fire and crop insurance?

Mr. VALGREN. Yes; a great many. We assist the companies in reorganizing and improving their methods. Of course, most of our correspondence has been with mutual fire insurance companies. On one trip last summer I helped to organize three new companies in Missouri and two in South Dakota.

Mr. ANDERSON. Mutuals?

Mr. VALGREN. Mutuals, yes. Those are county companies.

Mr. ANDERSON. What are you doing in the direction of forming large organizations?

Mr. VALGREN. There is a tendency to consolidate the very small farmers' mutual fire insurance companies. In States like Illinois and Wisconsin and also parts of New York these companies started out as township companies. It has been found that the variation in losses from year to year is rather too big on that small basis to be satisfactory, and many of the township companies are being consolidated. The county companies, in general, are holding their own.

STUDY OF CAUSES, ETC., OF TENANCY, OWNERSHIP, ETC., OF FARM LANDS.

Mr. ANDERSON. We will next take up the item on page 228, the study of the causes and significance of tenancy, the ownership of farm lands, and conditions which favor or retard the acquisition of land ownership by farmers, land utilization, land colonization, and the various aspects of the farm-labor problem.

Dr. **Taylor**. That will be handled by Dr. Gray.

Dr. **Gray**. The Division of Land Economics was started in the belief that we need more light in order to enable us to shape our course with reference to the economic utilization and tenure of our farm-land resources. We divide the work of the division into five main parts. The first is land tenure, including the ownership of farm lands, the tenant contract, and the economic causes and significance of tenancy; second, land values; third, land resources and land utilization; fourth, land settlement—methods of land settlement and colonization; and, fifth, farm-labor problems.

The last, of course, is not essentially a part of land economics, although it is closely related to it, but it represents a small phase of the work of the Office of Farm Management, which was added to the work of the division for administrative purposes.

We have given a great deal of attention to the subject of farm tenancy, the economic significance of tenancy. When you get into this field, you find that it ramifies in a great many directions. For instance, there is the question of ownership of rented land. Is the ownership of land becoming concentrated in larger estates? To what extent are farm owners absentees who do little for their tenants, but collect the rent.

In order to get more light on the subject, we have made a study of about 250,000 tenant farms. We have found out the amount of land owned by each farm owner, the location of the land with reference to the residence of the owner, and so on. In a considerable number of cases we have determined how the land was acquired, the amount of supervision given by the landlord, and similar facts.

We have not completed entirely the organization of this information, but I have here a table summarizing the results for three of the northern States, the corn belt States of Ohio, Illinois, and Iowa. For instance, for Ohio we find that of the landlords or land owners 79 per cent were residents in the counties in which the land was located, and 95 per cent, or, to be more exact, 95.6 per cent, were residents in that county or in an adjoining county.

Twenty years ago the census made a similar study. That is the first time we had any comprehensive information on this point, and their information merely covered the residence of the landlords within the county. We found that the addition of the adjacent county was significant. By studying the location of the landlords just over the line, it appeared that frequently to all intents and purposes, they were as near the farms in adjacent counties as when in the same counties.

It is recognized that one of the important causes of tenancy is the fact that in a good many districts the value of land is too high with reference to its earning power. In order to determine the districts in which this is significant, we have made a study of the relationship of cash rent to farm land value in about 160,000 cases, distributed in the more important districts of renting in tenancy in the United States. We carried out this method because cash rent comparatively represents the annual earnings of the land as an investment. We found, for instance, that in 160,000 cases the average return is 3.54 per cent. Of course there was a great variation for different parts of the country, all the way from 2 per cent for certain counties up to

15 or 16 per cent on the value of the land in some of the southern counties; that is to say, some of the counties in the Southern States.

I have here a table which summarizes by States the results of this study. If the committee desire it, I shall be glad to present this for publication in the record in order to illustrate the character of this work.

Mr. **Anderson**. Put it in the record.

(The paper referred to is as follows:)

Cash rents and farm valuation by selected counties of 34 States, 1920.

[Based on U. S. Census schedules.]

State.	Number of counties included.	Percentage of all cash tenant farms included.	Percentage cash rent was of farm valuation.	State.	Number of counties included.	Percentage of all cash tenant farms included.	Percentage cash rent was of farm valuation.
United States	567	32.9	3.54	Virginia	2	1.2	4.56
				North Carolina	7	13.5	6.03
Vermont	5	40.1	4.92	South Carolina	4	6.3	7.63
Massachusetts	6	38.9	4.22	Georgia	32	26.0	6.94
New York	13	26.7	4.91	Kentucky	12	9.2	4.47
Pennsylvania	9	10.3	3.68	Tennessee	7	16.4	6.91
Ohio	34	46.3	3.66	Alabama	19	49.8	5.80
Indiana	18	25.0	3.88	Mississippi	18	48.9	10.04
Illinois	42	43.6	2.97	Arkansas	15	50.6	10.66
Michigan	10	22.4	3.93	Louisiana	11	11.0	7.02
Wisconsin	8	18.9	3.63	Oklahoma	25	40.0	4.81
Minnesota	43	58.6	2.86	Texas	35	20.4	4.[illegible]
Iowa	44	50.1	2.88	Idaho	17	50.9	6.33
Missouri	25	23.2	3.38	Colorado	15	35.3	5.31
North Dakota	6	15.2	3.14	Arizona	1	43.6	[illegible].37
South Dakota	9	37.7	2.52	Washington	5	25.0	4.01
Nebraska	23	41.9	2.59	Oregon	11	48.4	3.37
Kansas	21	33.4	3.36	California	15	36.9	4.46

Mr. **Anderson**. I have an impression that in our country, at least, a great deal of the tenancy represents the retirement of farmers who have reached the age where they feel they are entitled to retire and the farmers who have died, and people of that sort, rather than any real economic development. Does your investigation show anything along that line?

Dr. **Gray**. We have made a number of local surveys which bring out the relationship of landlord and tenant. To a considerable extent the landlord is related by family ties to the tenant. This study that I spoke of will bring out in a very comprehensive way for at least 250,000 farms the extent to which the landlords or landowners are personally related to the tenants. We recognize that that is one aspect of tenancy, comparatively a normal aspect.

Now, it is generally recognized that the causes of tenancy, as the chairman has suggested, are different in different sections of the country; that we can not generalize too broadly about the whole country. Conditions are peculiar to different sections. Certainly, it is desirable to make sample studies in different districts, which are selected because they are typical for different reasons.

Mr. **Buchanan**. There is one great underlying cause for tenancy—inability of the tenant to buy the land.

Dr. **Gray**. That is very true. I might illustrate that point by reference to a local study which we made in five selected counties in the Black Prairie of Texas, which is a region where two-thirds of the farmers are tenants and where tenancy has increased very rapidly.

We studied, among other things, the power of accumulation of the farmer. We got facts as to the annual rate of accumulation through the entire productive life of the farmer, from the time he began to earn money until the time we made the study, and we found that 3.8 per cent of the farmers in that district saved as much each year as 65 per cent of the poorest savers in the group, and that the average cash tenant in that region would require 28 years to pay for his farm on the basis of annual savings.

Mr. BUCHANAN. You found that the average tenant would finally pay for his farm before he died?

Dr. GRAY. Well, that the average tenant would pay for his farm in 28 years. Whether his expectancy of life would be 28 years or or not, I do not know.

Dr. BALL. That would be the total paid up. He could acquire ownership in less time than that.

Dr. GRAY. Yes; that would be the total paid up. By an initial cash payment and incurring a debt for remainder of purchase price, he could acquire ownership in less time than that.

Mr. ANDERSON. Was this based on what he actually did save or could save?

Dr. GRAY. What he had saved, on the average, in his productive period of life.

Mr. BUCHANAN. What is the remedy for this tenancy?

Dr. GRAY. What is the remedy?

Mr. BUCHANAN. Yes.

Dr. GRAY. I doubt if we would presume to study it as we are studying it if we knew to our own satisfaction the remedy. I think it is true that students of the subject have some suggestions.

Mr. BUCHANAN. Are not economy and industry the only remedies?

Dr. GRAY. It is undoubtedly true that the personal factor, or personal equation, is an important consideration, especially in some sections of the country; more so in some sections of the country than in others, but we know that there are important regions in the country where people who are energetic and thrifty fail to climb into the ranks of landowners, no matter how hard they may work or how much they may save.

Mr. BUCHANAN. It is a very unfortunate condition. I understand there are three or four hundred thousand of tenancy cases.

Dr. BALL. But without tenancy how would a young man ever get a farm?

Mr. BUCHANAN. You have to have some tenancy, of course.

Dr. BALL. He has got to have a farm somewhere in order to have enough money to make an initial payment.

Mr. BUCHANAN. It is quite a serious problem. It is partially solved by the Federal Farm Loan Board. A long step has been taken to solve it.

Dr. GRAY. This study that I have mentioned, Mr. Chairman and gentlemen of the committee, is characteristic only as a sample of a considerable number of studies that we have made. We have materials for about a score of localities where we have studied intensively the causes and significance of farm tenancy, and we are now engaged in summarizing the results of these local studies for a report on tenancy. This is one of the lines of study in which we are at present engaged. I shall not take your time to illustrate the other lines.

As I said at the beginning, we are studying farm values and valuation of land resources, land utilization, land settlement, and farm labor problems. If you care to have those topics further illustrated, I shall be glad to present any information you desire.

Mr. ANDERSON. I think we should like to know, at least I should, what you are doing in regard to conditions which favor or retard the acquisition of land ownership by farmers, land utilization, and so on.

STATISTICS ON FARM VALUES.

Mr. WASON. What is the basis for farm values?

Dr. GRAY. Do I understand you to mean the sources of information?

Mr. WASON. No; I mean how do you arrive at the value of the farm?

Dr. GRAY. Well, for statistical purposes, of course, in getting large masses of statistics with reference to farm values, we simply have to take either the sale value, as recorded in the actual sale, or the estimates of the owner as to the value. For some purposes you may take one and for other purposes another.

Mr. WASON. Then your own valuation as a valuation is of no particular value; that is to say, you do not exercise any judgment as to value. I mean your bureau does not.

Dr. GRAY. You mean the valuation of farm lands?

Mr. WASON. Yes.

Dr. GRAY. Well, we have not attempted systematically to appraise farm lands. Such studies as we have made have been simply to get the facts as to either market value or estimated value of the farm lands. We do recognize that probably the process of appraisal, as now carried on, leaves much to be desired. I think that is recognized by those agencies which are engaged in the appraisal of land.

Mr. WASON. What you are doing is simply to take a census of the owners as to valuation, is it not?

Dr. GRAY. We have not made what you call a census because that implies complete data.

Mr. WASON. Well, a partial census?

Dr. GRAY. Yes; a partial study of statistics of land value has been carried on.

Mr. ANDERSON. Give us a brief statement of what the remainder of this item covers.

Dr. GRAY. The subject of land values, one of our major lines of work, I have already illustrated—the study of cash rents in relation to land values.

Then we have studied a number of cases of relationship between farm land values and the productiveness of the land as measured by statistics of production. We also recognize that we lack statistics on farm land values. We have decennial census figures on farm land values and we have annual figures made by the Bureau of Crop Estimates for several years back, but statistics that do not go very far back into the past; consequently we have not the data to relate variations in farm land value to variations in prices and other economic conditions that influence farm land values.

So we have endeavored to build up by a study of the statistics of land value, as shown by actual sales and county records, a picture of the movement of farm-land values year by year as far back as we can carry it. Of course, we can not do that for the whole United States; in fact, it would be foolish to do so. We have picked out and selected certain regions for special study in that regard. That is not all we are doing on farm-land values, but I may pass on now to the subject of land utilization and land resources.

LAND TENURE TO GRAZING LANDS IN SOUTHWESTERN STATES.

We have made a study of the use, that is, the relationship of land tenure to the grazing lands in the Southwestern States. We have also made a similar study in the Northwest, in Montana, and we are just now beginning on a tabulation of certain census figures relative to the use of lands, which have not been tabulated by the Census Bureau. That is a cooperative project with the Bureau of the Census.

Mr. ANDERSON. Tell me what practical use is made of information of this kind?

Dr. GRAY. To what information do you refer?

Mr. ANDERSON. This last proposition that you have been talking about—the uses of land.

Dr. GRAY. Do you mean what good it is to the individual farmer?

Mr. ANDERSON. No; I mean what use is made of it by economists, by farmers, or by anybody else.

Dr. GRAY. For instance, in the grazing region of the Southwest we made a map of the tenure of land. As you know, in that region the result of certain railway land grants was to produce a condition of dispersion of tenure. Public sections of land and privately-owned sections of land are in alternate sections. We have made a study of the relation of the use and control of the land to the tenure of it. It brought out the inadequate use made of the public range at the present time through lack of control by the ranchmen through some form of tenure.

Mr. BUCHANAN. Your study of the value of the land, as determined by the amount brought in by rental, is going to discourage land purchasers, is it not?

Dr. GRAY. We did not make the study for that purpose.

Mr. BUCHANAN. I understand you did not, but it inevitably will have that effect.

Dr. GRAY. The question may be asked if it is not already discouraging.

Mr. BUCHANAN. I think it is.

Dr. GRAY. We were studying the question as to the extent to which it may or may not be discouraging.

Mr. BUCHANAN. I think experience has discouraged it, but your reports will discourage it still further.

Mr. ANDERSON. In the last 10 years the actual increase in tenancy has been slight on the average, has it not?

Dr. GRAY. It depends somewhat on how you analyze the statistics. The statistics of farms rented show that in 1910 we had 37.01 per cent; in 1920 we had 38.08 per cent. The increase for the decade was about 3 per cent, whereas it had been about 5 per cent for the previous decade. If you will consider the area of land rented, of all farm land, it appears that about 9 per cent was the increase for the first decade, that is, the decade from 1900 to 1910, and approximately 11 per cent for the decade 1910 to 1920. In the ordinary statistics, as presented in the census, from the standpoint of the area rented, account is not taken of the fact that large areas—about 89,000,000 acres in all—are in the form of part ownership; that is to say, the landowner operates his own farm, a small farm, perhaps, in some cases, and rents additional land. If we had these figures on land rented by part owners and land rented by regular tenants we would have statistics showing about 42 per cent of our improved land is rented, whereas we had 40 per cent in 1910.

INVESTIGATION OF COUNTRY LIFE AND COMMUNITY ORGANIZATIONS, ETC.

Mr. ANDERSON. If there is nothing further on this item, we will take up the next item on page 229.

Dr. TAYLOR. In connection with this item for the investigation of country life and community organization, including rural population movements, etc., I want to make a few remarks on this subject myself. This subject is not very well understood, and I wish to emphasize that the work we have in hand is investigation.

Following the work of the Roosevelt country life commission, there was activity of one kind and another under one title or another—sometimes under the title of rural sociology, and other work under other titles of an uplift character—which would annually spring up and which raised a great many questions, but so far as I have been able to determine, has not settled many questions.

About that time I was in the University of Wisconsin and Dean Russel came to me one day and said that he would like to have work done on this country life question if it could be of a solid research type and not of the hot-air type that was so characteristic of work along this line. Having had a certain amount of sociology in the earlier years before I got into the field of economics, I fully sympathized with him in repudiating a very great deal of what was going on in this field. He asked me to see if I could find some one to take up this subject in a way that might lead to some result that would be worth while. With this in view I organized a little seminar, for which no credit was given, and got two students and two or three other people in the seminar and tried to discuss the possibility of developing scientific studies of country life problems.

Mr. ANDERSON. Pardon me for asking foolish question No. 1,000,000, but what is a "seminar"?

Dr. TAYLOR. Seminar is a title given in a university to a small group of students that gather around a table after the fashion we are gathered here, and discuss how a certain project shall be carried on. In other words, there is a certain amount of presentation, a certain amount of questioning, with everybody feeling perfectly free to ask questions.

As the result of this work, I found that the students that I had looked to, who were students of sociology, started out with a minimum of facts and a great deal of theory. What I was looking for was somebody to study the facts relating to country life with a view to better understanding the conditions that existed there. It happened that Dr. Galpin was in Madison and had other work at that time but because of his interest he was invited to attend the seminar. I had no thought of him as a man to develop this work, but by chance or otherwise he had spent a great many years as principal of a rural academy in New York. He was the last to present a report.

The thing that interested me and will interest you is that he came forward with a big piece of cardboard on which he had charted a community, the roads, the location of the school in the village, and the homes in that district, and there was a little indicator to indicate every contact for each one of these homes; in other words, he had started by making an analysis of what existed in that community. As the result of this seminar's work, I went to Dean Russel and told him that, given an opportunity, Dr. Galpin would develop this field in the way we wanted it developed, by studying facts that underlie the problem rather than starting in solving problems regarding which we knew little or nothing.

A study was made of two different counties. Then the time came that I came to Washington.

In connection with the plan that was laid out for the work, there was a desire for the scientific study of country life and the relations of farmers. I wanted Dr. Galpin to come here because I did not know of anybody else who .understood it in a scientific way. His salary was not high at that time, but when I wanted to bring him to Washington, Dean Russell bid for him $2,650 above what Prof. Ely was getting at that time. In spite of that fact, and because of the opportunity to stimulate work along this line in the various colleges, Dr. Galpin came with us, and since he has been here his work has been done largely in cooperation with a large number of workers in the different colleges throughout the country, and through the influence of this inductive method of work which has been injected into the study of the country-life problem, there has resulted a big influence over the whole study of sociology.

At the latest meeting of the American Sociological Society at Pittsburgh, between Christmas and New Year's, it became perfectly evident that the old sociologists, who had been taking hypotheses and spinning theories, were beginning to be in the minority and that the younger group, who were studying problems by the inductive method, and who had been influenced by this country-life method, were beginning to dominate; and the old classes of sociologists saw that it was necessary to take up an inductive study of facts instead of spinning theories.

I give you this because there is a quite general lack of knowledge of the class of work that is being done along this line. Having given this lengthy introduction in behalf of Dr. Galpin, I want him to tell you about a few of the things that he is doing.

Dr. GALPIN. I am somewhat embarrassed, I confess, by this introduction.

I think I ought to tell you of the unique position of this work of mine as compared with other units in the Department of Agriculture.

When I came down here a little over two and one-half years ago, I was asked to study farm population, its character, its make-up, and its movements; that is to say, its stability or its instability, and its living. I was asked to study what its living was, what it cost; in fact, the consumptive end of the farming population.

The first thing that I thought of when I undertook this work was that nobody was studying it; nobody had studied it in this country. I had to face the problem of creating methods of research.

There was only one expert—perhaps there were two—in the United States, who held research of farm population as legitimate, possible, or feasible at all. There was scarcely a dean or president in the United States colleges favorably disposed toward it.

So I spent my time in the first years in getting in contact with these deans and presidents, trying to show them the feasibility of making an economic study of population; that is, its character, movements, living, and so on, on a scientific basis, just as crops, animals, finances, credits, and the like had been. I have succeeded finally in making contact and establishing cooperative work with 12 of the States.

Now, about what I found was the state of mind of these deans and these directors. They said that the life of farm people was a most interesting topic of discussion in the States. They said that it was not a barren, an uninteresting, topic; that, on the contrary, it was a very vital topic, but they added that everybody had all kinds of notions with regard to farm people, their lives, their institutions, and what they ought to do. They said that the worst things had been shown about farm life, but that there were so many remedies about how to cure the evils that they did not know how to go about it. I suppose that is what Dr. Taylor referred to when he spoke of "hot air" and "uplift" methods.

There was absolute chaos in general in these States about what they ought to do in regard to bettering the living of farmers. I made up my mind that we had no facts on farm population. We had no measure by which we could test the theories of men born on farms, whether merchants or bankers, who say "I know what should be done." There was not any measure of another man's opinion, because we had no facts on farm life.

STUDY OF FARM POPULATION, LIVING CONDITIONS, ETC.

The United States census had never given us the absolute, exact facts on farm population, not even the totals for the whole country, not even the totals for States, and we do not have them to-day in print. Now, that was the situation when we came in here to try to make some research. We had no basic information.

You gentlemen know about statistics, for you are economists and statisticians. You know that you can not have statistics about a subject which you have not counted. You can not have statistics about cattle until you count them; you can not have statistics as to the character of blood until a blood count has been made; nor can you have statistics relating to bacteria without a count. The count we did not have. We did not have a basis for research. Now, what was the first thing to be done, therefore, in order to put this topic of great interest to every State, to every farmer, to every family, and to every community on a scientific basis? We had to have a count. So the first thing I did when I came down here was to put all the energy I had into an argument with the United States Census Bureau Director that he put into the 1920 schedule—very fortunately a schedule was being made out—the question of "living on a farm."

We brought it to pass so that in every one of the 105,000,000 schedules you will find that everyone had to answer the question whether he was living on a farm or not. Those answers are piled up there in the United States Census Bureau, but you can not get those facts because they have not tabulated them. That means that we made the first step toward a count, and the first thing that lay up to me was to demonstrate what a count would do in regard to farm population. Therefore, as soon as the schedules were out of the regular census use sufficiently, something like three or four months ago, by a cooperative project with the Director of the Census, I was enabled to put some statisticians with a group of temporary clerks, together with one or two of my permanent clerks in the Census Bureau, and make a tabulation of the farm population; and that tabulation included everyone—males, females, adults, children, infants. This is a tabulated count of the farm population in eight counties of seven States of the United States.

We took Texas, North Carolina, Wisconsin, and Washington. We tried to scatter them over wide areas. We took Missouri, we took New York, and so on. We selected one county in each of six States (in Missouri two small counties) and attempted to get a sort of cross section of the farm population.

That process of tabulation has not been completed. The census authorities have kindly given us the use of their counting machines. I have before me that count separated into males and females of the farming population for Otsego County, N. Y. We have some for Ellis County, Tex. We have some for Wake County, N. C., and so on through. For King County, Wash., in which Seattle is located, we have all kinds of statistics on the agricultural population

We are going to demonstrate that we must have a count of farm population before we can reduce the economic study of farm population, its character, movements, and living, to any scientific basis. That is one of the reasons why we can not present you with the various statistical results, maps, charts, and so on, of farm population all over the United States.

I have before me certain tabulations for Otsego County, N. Y., and certain tables for all the counties named; and to show you just the discrepancy between the rural population, which has been about the only key that we have had to the farming population, and the actual farming population by count, let me say to you that in Cass County, N. Dak., there was an excess of rural over farm population of over 5,000; in Dane County, Wis., there was an excess of 13,000; in Ellis County, Tex., over 5,000; in King County, Wash., an excess of over 46,000; in New Madrid County, Mo., nearly 9,000; in Otsego County, N. Y., 11,000; in Scott County, Mo., 6,000; and Wake County, N. C., over 11,000. That means a total excess in these eight counties of the so-called rural population over the farming population of 110,000. This means that in a tabulation of three-quarters of a million of the population of the United States—that is, a little less than 1 per cent of the total population of the United States—the excess of the rural population over the actual farming population is 110,000.

Now, the question would be, if you wanted to make an estimate of the farm population of the United States, whether the ratio that we have in those eight counties would hold for the whole 3,000 counties.

There is nobody who can tell. If we could use that ratio, the farming population of the United States would be 32,280,000, provided that the ratio between the actual farming population and the rural population held good for the whole area.

The estimate that you read in your paper a few mornings ago was around that figure, but what we want is not merely the total of farm population for the whole United States; we want it by counties; we want it by areas, so that we can know the character related to areas of low production, related to areas of high production, and so on, and we want it with regard to whatever health data there may be. We want it also with regard to literacy and illiteracy.

With regard to illiteracy of the farming population, I find that if you were to take the illiteracy of the rural population in Otsego County, N. Y., as a guide for the illiteracy of the farmer, you would be giving the farmer a terrific black eye, because the illiteracy of the rural population is something like 82 per cent in excess of the illiteracy of the farming population; that is, the rural population in Otsego County is not as literate as the farming population.

We have found that same thing true in regard to Negroes. We have found that the Negroes on the farms were more literate than the Negroes in the villages and towns. Now, that is a thing that we do not know enough about. We are stigmatizing the farming population by not knowing the real facts about farm people.

Economists will not tolerate for a moment a lack of knowledge about cattle, about corn, wheat, and other products. Yet you know and I know that we have not that information with regard to the farming population of the United States.

That is enough about that one thing. That [indicating] is a sort of exhibit of the thing. We are out to put this whole project upon a scientific basis. I believe that we have convinced 12 directors in 12 States so that we are on a 50-50 basis of cooperation in projects for research, in which we have instructed the instructors in those places. We have given them the method, and have seen that they carry it through.

The second thing, and the only illustration I am going to give you, is an attack upon the question of standard of living. I said that our task was to get living conditions. We are attempting to get the standards of living of farm families and farm commodities; we are attempting to get the living condition of the farmers engaged in different types of agriculture; and the living condition of those having the status of owners and tenants.

The standard-of-living question brings us at once into the area of prices and of income and of a fair return for the farmer's work. Just look at the arguments of your labor unions. They argue that it is the living that determines the wage and the profits. They want to know more about living. We do not know about farm living in this country. We do not know about prices of farm clothes, which are different from other clothes. We do not know about the cost of transportation of a family character for the farmers; and whether it costs more than it does in cities or not is a question. We do not know the cost of housing for families. It costs more presumably for the modernized house in some respects in the country than it does for the same house in the city, because the former is far away from plumbing establishments and so on. We want to know all those things. We do not know the cost of these items in the living of the farmer. Therefore we are attempting to study the standard of living, as to quantity, quality, and the cost, in order to bring those into direct relation with the farmer's income and the farm laborer's income.

We have started in with 412 farms that Dr. Warren at Cornell had studied previously, getting all the farm and labor incomes. We had all those farm incomes and those labor incomes to compare with the living costs and budget costs for families for one year.

These things give you an insight into the attempt we are making to carry this idea out, about knowing facts first about the farming population in every State.

Mr. ANDERSON. How do you go about studying the farmers' standard of living?

Dr. GALPIN. We make out a very careful schedule. That includes all kinds of things that the farmers buy, just as far as we can make that out, and it covers clothing, foods, transportation, fuel, housing, education, and things of that kind. Then we go into expenses for travel, leisure, taxes, insurance—all of those items of consumption. We try to find out where the farmer's money goes.

We have cooperated in this with the home economics office. We would not for a moment think of going into the technique of another department. This was done in cooperation with the home economics research work. They furnished two technicians, and Cornell University furnished two more. They went to farm houses and visited three a day, took three months to do it, and got all of this information from 412 families. This information is being tabulated. We have to use, as a basis of working it out, the budget standards of our home economics department, and then use, as far as applicable, the standards already worked out for city budgets.

Mr. ANDERSON. I have seen some city budgets, but I do not think they are worth a continental.

Dr. GALPIN. I think we can be as influential in respect to budgets as we have been in making popular the inductive method in the study of sociology.

MONDAY, FEBRUARY 13, 1922.

INVESTIGATIONS OF HANDLING, SHIPPING, REFRIGERATING, ETC., OF PERISHABLE FARM PRODUCTS.

Mr. ANDERSON. We will take up this morning the item on page 230 for the Fruit and Vegetable Inspection Service.

Mr. SHERMAN. You will notice that the appropriation for the market inspection of perishable foods is divided between fruits and vegetables and butter inspection. Although the language of the item covers several other commodities, the inspection has never gone beyond those two classes, and the additional language was inserted by Congress without the suggestion of the department and without the addition of further money, so that there has been no inspection of eggs, poultry, or hay.

This inspection service, as you know, might better be called a certification service, because it is not inspection in the ordinary policing sense. It is purely a matter of service, and no inspection is ever made except when somebody wants a certificate. The issuance of a certificate is the object of the inspection, and the certificates are paid for.

The history of this item, as you know, has been a little different from that of most items. It was originally put in an appropriation bill while it was under consideration in Congress in language which I do not think was submitted to the department for criticism, and, in the first year, was only for the benefit of shippers. It was in order to enable the Secretary of Agriculture to render to shippers this service; so that it was very much restricted, and the language with reference to fees, which says that the fees shall be reasonable, and, as nearly as possible, cover the cost of the service rendered, did not enable the department to go very far toward self-support in the administration of this item under the original language.

The next year the language was broadened, I believe, so that the department might issue a certificate to any interested party. Then the railroads and the receivers began to use the service to a considerable extent.

Then the third year the broader language remained with regard to who might use the service, but the restriction was thrown in limiting the inspection to commodities received in interstate commerce. And all the way through from the beginning there has been the restriction that inspections might only be made at important central markets which the Secretary may from time to time designate.

Mr. ANDERSON. Was not that interstate commerce provision in the appropriation as originally drafted?

Mr. SHERMAN. No, sir; not the first year and not the second year. The third year it was introduced.

Mr. ANDERSON. This appropriation has only been going for three years?

Mr. SHERMAN. We are in the fourth year. That interstate commerce limitation was not in the first two years. Frankly, the department has always felt that the limitation was put in under an apparent misapprehension. The discussion in connection with it indicated it was the thought of those who suggested it that it would limit the wild growth of the Bureau of Markets and might limit the extent to which we would put on an army of inspectors, and so on, and would limit the expense attached to it.

It has not so operated, because the expense of the service is limited absolutely by the appropriation you make; the number of men we can employ is limited by the appropriation which is made by Congress and not by the language. The language limiting the inspection to commodities received in interstate commerce merely limits the usefulness of the men who are employed and limits the amount of money we can collect and turn into the Treasury, and makes it just so much more difficult to approach self-support, it being a service just like the service of the Post Office or just like that of the Extension Service, having no regulatory or police function whatever, and of course it does not rest on the power of Congress to regulate interstate commerce.

Mr. ANDERSON. It may have been something in the nature of what you have suggested, in the minds of the gentlemen who were interested in having this restricting language put into it, but I think that the principal thing in the minds of those men was the fact that these certificates, having the status of prima facie evidence in the courts, of the United States at least, that there was some question as to the legal power or, assuming the power, the desirability of extending the service to shipments over which Congress does not have direct control. Of course, I understand this is purely voluntary.

Mr. SHERMAN. I think, Mr. Chairman, if you would review the record of the hearings, the point I made would be rather evident to you, from some of the remarks made at that time, which seemed to indicate there would have to be some limit put on this service or it would grow out of all bounds.

Mr. ANDERSON. Those things have happened.

Mr. WASON. Do you think that would apply to your bureau any more than to the average bureau of any Government department?

Mr. SHERMAN. No; we think it was unfortunate to attach that language to this item, because it simply means that the man who inspects a car for one shipper can not inspect it for another shipper even though those cars may be in the same train.

Mr. ANDERSON. That is applicable so far as the language "in interstate commerce" is concerned; but it is not applicable so far as the new language proposed, "or at points which may be conveniently reached therefrom," is concerned.

Mr. SHERMAN. That deals with the other question of location. The change of language is intended to remove two restrictions. First, to permit us to inspect products which have not yet left the State. That question often comes up in connection with the service. We may be asked to go out to inspect a cold storage warehouse full of apples at Winchester, Va. They want a Government certificate on them before they move out and we can not inspect those because they have not moved in interstate commerce, even though it might be very profitable work to send an inspector there and get the $4 a car, plus the expenses of inspection, and of course this $4 a car and expenses of inspection always goes back into the Treasury. The particular annoyance comes up in such places as New York City, where large receiving concerns may be getting a considerable number of inspections from day to day on perishables coming in from another State, and when a car comes in which has originated in Western New York, they can not get it. The same Erie freight engine brings in the car that originates over on the Pennsylvania side of the line; and that we can inspect and the other we can not inspect, although they are coupled together in the yard.

Mr. ANDERSON. The unfortunate part of it is, even though a majority of the committee should feel the way you do about it, we would not want to make any change, because the whole item is subject to a point of order and if we put in the new language somebody may suggest that the whole item go out.

Mr. SHERMAN. I merely wanted to get the problem before you.

RECEIPTS FROM INSPECTIONS.

Mr. BUCHANAN. How near self-sustaining is this item?

Mr. SHERMAN. Five-sevenths, during last year. We had $141,000 last year and we turned back into the Treasury $99,504.33. It is almost five-sevenths. And that, frankly, is as near self-supporting as I think this item can ever be expected to be under the present limiting language. If we do not remove the limitation both as to the cars which we may inspect and the places at which we may inspect them, I do not see how we can expect to come much nearer to being self-supporting, although in the first six months of this fiscal year we have done a little better than that. And, incidentally, the income from this service has, in every year, exceeded the estimates we made for it at the beginning of the year.

Mr. ANDERSON. What have been the receipts so far this year, for the first six months?

Mr. SHERMAN. $63,833.94. That is at a slightly higher rate than five-sevenths, even considering the fact we are spending a larger appropriation this year.

Mr. MAGEE. Who pays this money?

Mr. SHERMAN. The party requesting the inspection. If the shipper requests the inspection, he pays the fee; if the receiver requests the inspection, he pays the fee; if the broker requests the inspection on behalf of the shipper, we charge it up to the broker, but the shipper's check is very apt to come in; and if the railroad requests the inspection, the railroad pays the fee.

Mr. BUCHANAN. If this language limiting it to interstate commerce was removed, and the other language was removed, would that enable it to be self-sustaining?

Mr. SHERMAN. I should not expect it to be wholly self-sustaining.

Mr. BUCHANAN. Would it be any nearer self-supporting?

Mr. SHERMAN. It would be nearer self-supporting, yes. In the end it would enable us to be decidedly nearer self-sustaining.

Just another statement with reference to the interstate part. Take our office for instance, at Detroit, the fourth city now in population. In Detroit we maintain only one man. There are months in the year when he is not fully occupied, because during those months Detroit is supplied almost altogether with Michigan potatoes, with Michigan cabbage, and to a considerable extent with Michigan fruit. In every year our potato inspections have been the largest item for the country as a whole.

Mr. BUCHANAN. You can not make an inspection at shipping point, even though a cooperative marketing organization or association of farmers requests the inspection?

Mr. SHERMAN. If they request it at the receiving end out side the State we can, but we can not go to the shipping end and inspect for them, because we can not inspect until the goods have moved in interstate commerce and have arrived at a market designated by the Secretary.

Mr. ANDERSON. What are the markets designated now?

Mr. SHERMAN. There is quite a list of them here.

Mr. ANDERSON. Is it a very large list?

Mr. SHERMAN. Yes, it is quite a large list. We have inspectors permanently stationed in 30 cities.

Mr. MAGEE. You would meet with strong objection if you were to attempt to strike out the words "in interstate commerce," would you not?

Mr. SHERMAN. It does not seem to me we would have any opposition. We are trying to make this service as nearly as possible self-sustaining. It is not anything which can be forced upon the buyer. We do not inspect for any one unless he asks us to do so.

Mr. MAGEE. This is a Federal Government service; that is the reason you should limit this service to points where it becomes an interstate shipment.

Mr. SHERMAN. Does not the Government render a great many other services to individuals?

Mr. MAGEE. I suppose the Government some day, if some people have their way, will become so paternal that nobody will dare turn around unless he gets the consent of Washington; but it seems to me you will meet with very strong objection if you strike out that language. I remember this question came up a year ago, and we finally left in the provision. I assume the same objection would be raised now. I was trying to get at your idea of why you wanted it removed.

Mr. SHERMAN. My idea is if the Government is going into a business proposition of this sort it ought to be handled on a business basis; and if we offer to do a thing for pay and make the inspection only when called, and we do not make it unless we are called, we ought to be at the call of every citizen. And we understand there is no legal reason why we can not do it; it is just a question of policy.

Mr. MAGEE. The principle involved here is that you are dealing with commerce, as I understand it, and the Government confines itself to interstate commerce and does not attempt to deal with intrastate commerce.

Mr. SHERMAN. Is it dealing with commerce? It is not our opinion we are dealing with commerce at all.

Mr. MAGEE. That may be your idea.

Mr. SHERMAN. Are we dealing with commerce?

Mr. MAGEE. You are dealing with shipments directly.

Mr. SHERMAN. We are dealing with the commodity in the car or in the warehouse.

Mr. MAGEE. But it is shipped from one State to another, and from one part of the country to another. We are legislating for the country as a whole and there is a great question, it seems to me, whether this language ought to be struck out unless there is some very strong reason for it.

Mr. SHERMAN. Would it be your idea that Congress would be incompetent to authorize the department, if it saw fit, to inspect at the point of origin?

Mr. MAGEE. I am not saying whether Congress might be competent or incompetent.

Mr. SHERMAN. Excuse me; I did not mean to ask an improper question.

Mr. BUCHANAN. I understand all of this service is voluntary; that it is at the request of the interested parties?

Mr. SHERMAN. Absolutely.

Mr. BUCHANAN. Then this statute provides the inspection certificate shall be prima facie evidence.

Mr. SHERMAN. In a United States court.

Mr. BUCHANAN. There might be legal objection to that item in a State court, on intrastate commerce, but it strikes me to confine it to interstate commerce on shipments at the point where they are received, really deprives the farmer of the benefit of this service. He wants a certificate on his carload when he ships it, or before he ships it.

Mr. SHERMAN. That involves the question I just asked.

Mr. BUCHANAN. And this is a Bureau of Markets for the benefit of the farmer, and by putting in those words "in interstate commerce," it deprives the farmer of the real benefit of it. If he got a certificate on his carload before he ships it, he could get a farier price and there would be a better understanding of it.

Mr. SHERMAN. That brings up another question, which is a very vital one in many important fruit and vegetable shipping areas. They are now undertaking in many States to do that very thing—issue a certificate at the point of origin, and every State which develops a shipping-point inspection service for its growers immediately realizes, and the growers realize, that they want that service federalized, because then the certificates issued would be good outside of the State.

Mr. ANDERSON. They want everything federalized.

Mr. SHERMAN. That service would be pretty near self-supporting.

Mr. ANDERSON. It does not make any difference whether it costs something or does not cost something.

Mr. SHERMAN. They want a certificate that can be used everywhere; they want a piece of evidence that is good everywhere the car goes. California can not issue a certificate that is good everywhere. California has an excellent shipping-point service (it is voluntary like this), and the shippers have called the State in and paid money enough for that service to make it entirely self-supporting on a purely voluntary basis, yet the certificate is good only in the State courts.

Mr. BUCHANAN. My point is this: It says "fruits, vegetables, poultry, butter, hay, and other perishable farm products, when received in interstate commerce." You inspect only when it is received in interstate commerce?

Mr. SHERMAN. Yes, sir.

Mr. BUCHANAN. And now, if you had 50 carloads of onions at Brownsville, Tex., and they have been loaded on cars and a bill of lading has been issued for them, you could not inspect them?

Mr. SHERMAN. We can not send a man in there at all for that purpose.

Mr. MAGEE. The owner might not intend making a long shipment; the shipment may only be within the State.

Mr. SHERMAN. Those are among the longest shipments we have in the country; those from the lower Rio Grande Valley.

Mr. MAGEE. If it is an interstate shipment.

Mr. BUCHANAN. Even though they know it is destined for interstate commerce, they can not inspect now until after they have received the shipment in interstate commerce?

Mr. WASON. They have to move from one State to another.

Mr. BUCHANAN. What I want to find out is whether this cooperative association of farmers can get a certificate at the point where they ship this stuff?

Mr. SHERMAN. There has been a bill introduced now which will provide for that; the Agricultural Committee has a bill before it providing for that very thing.

Mr. BUCHANAN. It will vitally affect the shippers of perishable products if you are enabled to give them a certificate at the time or immediately before they are shipped that it is good stuff and in good condition, and perhaps classifying it.

Mr. **Sherman**. It would be a very valuable selling document, and that is what they want.

Mr. **Buchanan**. Certainly it would; and in this day of cooperative associations——

Mr. **Sherman**. As I say, that is the sort of thing that is already being handled by the States (where the certificate is not anywhere near as valuable as our certificate) and it is being made self-supporting.

Mr. **Lee**. Is not that in a way what is done in the bonded warehouse? You give a farmer who puts his cotton in a bonded warehouse a receipt for a certain grade of cotton. It is there in that State. He does not know whether it is going to be shipped out or not, yet he gets a certificate that can be used anywhere in the United States.

Mr. **Sherman**. A United States certificate issued on perishables at the loading points would carry the same conviction to anybody to whom that certificate was offered, that the car was right when it started, and that would be a valuable selling document. California charges $5 for the same inspection, and it has more business than it can do.

Mr. **Lee**. I think it is absolutely vital to give the farmer a certificate before he ships it out.

Mr. **Wason**. Where does that bring you to from the legal standpoint?

Mr. **Buchanan**. It would only exclude that prima facie evidence feature in a strictly intrastate transaction; it would have no effect on those shipments that did not enter into interstate commerce. But the evidence is not the important thing to the farmer. The evidence is important to the farmer when he gets into litigation in court, but the important thing is that he gets before the purchasing public the fact, that he has these commodities; that they have been inspected by Federal inspection and found sound, or of a certain class, and the purchasing world relies upon that. That is the important thing in grading and marking. It is not adjusting a dispute between the farmer and the purchaser, which may never arise. Of course it may arise one time in a year, or even oftener, but that is not the important thing.

Mr. **Sherman**. The service as it stands is valuable to the shipper in that the certificate helps him to adjust disputes and protects him to a certain extent against unjust reductions in particular markets where he can use it. The service you have in mind would be a service which would enable him to sell, with even greater assurance, that that would be the last he would hear of it.

Mr. **Magee**. Suppose you had that authority, how large an increase in your force would it take to inspect a carload of products for every shipper at the source?

Mr. **Sherman**. This change in language would not enable a change in the force to be made; it would simply increase the efficiency of the men we already have.

Mr. **Magee**. I am talking about where you are required to inspect every car shipped by every farmer in the United States at his shipping point (I presume on his farm, probably); how large an amount would you need to enable you to increase your present force to meet all the requirements?

Mr. SHERMAN. It is impossible to answer that question. Yet it is a fact that nobody undertakes to do that in the States, even where they have mandatory legislation.

Mr. MAGEE. I have assumed here we are going to have it all certificated at the source of shipment, as I understand.

Mr. SHERMAN. It could only be done, of course, in the heavy shipping districts; it could only be done where there was a heavy volume of business. That is the principle recognized everywhere.

Mr. MAGEE. That is just what I am driving at. You say in this language "at such important central markets as the Secretary of Agriculture may from time to time designate."

Mr. SHERMAN. Yes, sir; at the place where it is received.

Mr. MAGEE. Certainly; but it is at that place where the shipments are more or less centralized, like New York, Chicago, and some of the other large receiving centers.

Mr. SHERMAN. Where the shipments come in?

Mr. MAGEE. If you had to go to the point of shipment for each one of those cars, you would have to have a large army of men, would you not?

Mr. SHERMAN. No one would ever undertake that; no one undertakes to do that now. Even in Colorado, which has a mandatory law requiring every carload of fruits and vegetables to be inspected before it is shipped, there is a little safety valve which says that in cases where the locations are remote or the volume of business so small that the director of markets finds it impracticable to make the inspection, he may issue permits for the goods to be moved without inspection.

The producing areas are almost as concentrated in this country as the receiving areas. There is a period of two months when practically the entire onion supply of the country is in south Texas, and where four or five men, or perhaps 10 men, could be used every day and earn a profit for the Treasury every day for two months, inspecting outgoing cars.

Mr. MAGEE. They raise a lot of onions in Texas, and they also raise a lot of onions in New York.

Mr. SHERMAN. At another season of the year, those men would be in New York. It is impossible to say how many men it would take. If I were running the service and had any option in the matter, I would only ask for money and employ so many men, in other words, to carry the overhead; the remainder could be handled without any particular burden on the taxpayer and without adding anything to the overhead. I would establish the service wherever there were enough people to use it to make it self-supporting, and so far as the payment of the salaries of the men was concerned, they would be actually earning them in fees paid for inspection work.

Mr. BUCHANAN. The fact it is nearly self-supporting shows it is considered a valuable service.

Mr. SHERMAN. How much it would cost would simply be governed by the question of whether Congress pushed us into districts where the volume was so small that it did not pay for the inspection. If we started out to make it self-sustaining, we would want to put it in where there was a certain volume of business; and if we did that, we could make it self-sustaining all right.

Mr. **Wason**. Is it a good principle of government to favor a large group, owing to their influence and producing power or selling power, or is it the little fellow that the Department of Agriculture reaches out and helps to give a chance in the activities of life, and to let the big packers and combinations take care of themselves, as they are well able to do?

Mr. **Sherman**. I will answer that with reference to fruits and vegetables. It is well known that in everything pertaining to the marketing of fruits and vegetables the areas of intensive production have the advantage; it is an advantage which can not be taken from them; it is an advantage recognized in many ways. They get better car service; they have more buyers and more competition for their goods; they are able to support a stronger organization; and they can go into the brand and trade-mark business and can make better terms for their goods. They have a peculiar advantage arising from quantity production. I do not see where any criticism could lie upon Congress or the Government if Congress should authorize an inspection service and limit it to those districts where there is a sufficient volume of business to make it practically self-sustaining. Even our public-school system does not serve everybody alike.

FEES FOR INSPECTION.

Mr. **Buchanan**. When you inspect at a certain point, you do not confine the inspection to only the products of a big organization, or anything of the sort; you inspect for all who are willing to pay for it, whether they are big men or little men—when you inspect at certain points?

Mr. **Sherman**. We have a fee of $4 for a carload and a fee of $2.50 for less than a carload.

Mr. **Buchanan**. You would inspect just as readily for the little man as for the big man?

Mr. **Sherman**. Oh, yes; absolutely.

Mr. **Buchanan**. It is not the size of the man or the strength of the organization, but the point at which you inspect, that justifies keeping inspectors there or placing inspectors there?

Mr. **Sherman**. The same discrimination is created in the service we have now; the man who ships a car to a small town where we have no inspectors can not get Government inspection.

Mr. **Buchanan**. No matter how big a man he is?

Mr. **Sherman**. No matter how big a man he is. The man who ships a car to New York or to points where we do maintain inspectors gets a special service. There is not a point in the State of Alabama where a man can get Government inspection of a carload of stuff unless he pays the transportation of our man from Atlanta, in addition to the fee of $4, and then it has to be on a day when the man at Atlanta can spare the time to go over there. That same thing is true of a dozen States. The present service is just as unequal in the benefits to be gained from it as a service at shipping point would be.

Mr. **Magee**. I suppose you can put a man in Alabama if you want to.

Mr. **Sherman**. We would not have business enough to make it self-supporting. A man in Birmingham would have a good many inspections to make at a certain season of the year, but for a large part of the year he would not. In Texas, take it at Houston, the busy season will average eight months of the year, and at Fort Worth it will average eight or nine months; but during the other four months the volume of business is so small that we transfer our men to Pittsburgh, St. Louis, or Chicago, where there is a greater volume of business during the summer months. We have a limited number of men, and we move them around where they are most needed. The New York, Philadelphia, Chicago, and Pittsburgh inspection offices are earning a profit to the Treasury right straight along, year in and year out; the volume of business there is so great and the four or five men we have there are so continuously employed, that at $4 a car they are earning a profit for the Treasury right along. Our office at Milwaukee is not profitable to the Treasury because the man in Milwaukee can not inspect the products that come in from the other part of the State. Omaha, Nebr., does not earn a profit, although Omaha is a good way from other inspection points. Kansas City will be self-supporting for certain months of the year, and for certain other months of the year it will not be self-supporting. Atlanta will always be just a little short of being self-supporting. And so it goes. We get urgent requests to place inspectors at cities where there is a certain amount of business and they have great need for them in certain months, but where we know they can not be self-supporting we do not send them. For instance, San Antonio, Tex., is a point where we have been urgently requested to come; others are Des Moines, Iowa, and Denver.

There is an acute demand for a man in Denver, but there is such a large part of the year when Denver is supplied largely by Colorado products that a man in Denver can not earn enough money to make it worth while to keep him there. Now it is specifically stated in the bill that Congress wants us to make this as near self-supporting as possible.

The question of discriminating between the services rendered two different classes of applicants, comes up very pointedly in connection with our work for the railroads. This service has won its way with the railroad organizations gradually, until in some cities the amount of business offered us by the railroads is a very considerable part of what we do. It is particularly so in Philadelphia and Pittsburgh. The railroads have found it of so much benefit to them to have a thoroughly competent certificate as to the condition of the fruits and vegetables arriving, showing the cause of deterioration, and the specific names of the diseases which are responsible for the injuries—they have found it so helpful in determining their liability, that they are now at the point where they think they want inspection on every carload of perishables that comes in. But they say there is no such thing as paying $4 a car for it. They have now gone out to commercial agencies and are getting bids on that business from commercial inspection agencies, with whom we are more or less in competition, and of course they get the bids way down on a guaranteed volume of business of 50,000 cars. We are not competing for that business; we are not reducing our fees to try to keep that business. As a strictly business proposition, if this was only a matter of dollars and cents, and if there was no question of discriminating between applicants, we would naturally cut prices to the railroads for quantity business.

Mr. Magee. Do you know at what they get inspections per car from outside sources?

Mr. Sherman. We have heard that they can get an inspection for something like $1 a car, but we know what sort of inspection that means. It means somebody to go out and look into the car and simply be available as a witness in case any question arises about it. It is not the kind of inspection we give. We have heard, indirectly, that a bid has been made of less than $1 a car on a guaranteed volume of 80,000 cars; that is, they have had an offer to do that work for them for $80,000 or less; that is for one of the railroads.

Mr. Magee. I should think an inspection like that, if the facts were brought out, would not be of much value in case there was litigation.

Mr. Sherman. It furnishes a good bluff.

Mr. Buchanan. The trouble about that is they inspect and the other fellow does not.

Mr. Anderson. Where, for instance, the railroad might ask for an inspection certificate, and the shipper also asks for an inspection certificate, what do you do?

Mr. Sherman. The inspection is always made for, and charged up to, the first applicant, but the shipper always gets a copy of the certificate. We have been criticized for that by the railroads and some receivers, but we have made it a point from the beginning that the shipper should always have a copy of the certificate so that he could know what was the matter with his carload, whether he was the applicant or not. We have felt he was entitled to that much education and, in many cases, the trouble with the carload is one which it is within the power of the shipper to prevent, or to safeguard against. We have felt he should know what the trouble was. The railroads criticize us and say "if the shipper asks for an inspection, we do not get a copy of the certificate; but if we ask for an inspection, he does get a copy of the certificate." But we have stood that criticism on the ground that it is legitimate education. Now any one asking for additional copies of an inspection certificate pays a dollar apiece for them. The applicant gets two copies of the certificate and if, after that, he wants additional copies, we charge him a dollar apiece for them; or if some other party, other than the applicant or shipper, wants copies of the certificate we charge them a dollar apiece for those copies.

Mr. Buchanan. Both sides get a copy of the certificate if they want to pay for it?

Mr. Sherman. Oh, yes. There is one other point about the matter of the location "or at points which may be conveniently reached therefrom." The other day five carloads of potatoes came into Washington and were inspected on the request of the receiver, a dealer. He sent one car down to Quantico, to the Marine barracks, and the receiving officer at Quantico rejected that car. The dealer wanted an inspection on it. Is Quantico an important central market of the United States? It is rather putting a forced construction on this language to call Quantico an important central market, and yet we sent over a memorandum and asked the Secretary to designate it as such, and sent an inspector down there to inspect the car. That illustrates the usefulness of the change of language which we have suggested "or at points which may be conveniently reached therefrom."

I have here a telegram dated February 7—I could bring you these things that come in any day in the week—from Spokane, Wash.:

> Have three cars apples stored Malvern, Iowa. Believe Malvern not designated market. Would like to have you make exception in this case and send man from Omaha—our expense—to make inspection.

Malvern is 12 or 15 miles out of Omaha, on the Iowa side. There is no question about the interstate shipment in that case, but Malvern is not a designated market. It happens to have a cold-storage plant which has been utilized this year by Western shippers. Before this inspector can go over there and earn this $12 for the Treasury, which can be done in three or four hours' time, we must have the Secretary of Agriculture designate Malvern as an important market, for the purpose of this law.

Mr. BUCHANAN. Which it is not.

Mr. SHERMAN. Nevertheless, Omaha is and Malvern is a place conveniently reached therefrom.

Within the last three or four days our inspector at Rochester, N. Y., has been asked to inspect a carload at Hilton, N. Y., and a carload of oranges that arrived at Lyons, N. Y., a few miles out of Rochester. He could not go there because neither of them were important central markets, and yet both of them were within a few hours' ride of Rochester. Those things, as you see, simply limit the earning capacity of the men on the ground; they make it, as I say, impossible for us to approach any nearer self-support than we are now, in this item.

MEN ASSIGNED TO INSPECTION WORK FOR NAVY DEPARTMENT.

There are seven men of this force who are assigned to work entirely for the Navy Department. The Navy wants us to inspect the fruits and vegetables which are delivered to them on contract at their principal receiving stations. They want them inspected by competent men who know the fruit and vegetable game, and who know what it is reasonable to expect a contractor to deliver. So we have these seven men whose salaries are, for all practical purposes, a revolving fund coming out of this appropriation. They are earning no profit for the Treasury. They are costing us nothing, because the Navy Department pays their expenses; but we have selected the men, we have trained them and have assigned them to the Navy Department's work. Every three months we bill the Navy Department for their salaries and there is a transfer made in the accounts at the Treasury Department from the funds of the Navy Department to this appropriation, corresponding to the sum we pay these men for their salaries. So that out of this fund there is practically the salary of seven men which is a revolving fund between our department and the Navy, and these men are not doing anything for the ordinary commercial shipper or reciever; they are working for the Navy. And I presume most of the men who are delivering to the Navy under contract would not say they are working very much for them, because they are turning down a large amount of stuff every month.

We get a report every month showing how many pounds of commodities have passed their inspection and how many pounds have been rejected; and in many cases, where there is not time before the sailing of a vessel for the contractor to replace the shipment, our men say, "The cut on these goods should be so much." So that they must be men who have a commercial viewpoint to say, "These goods should be received with a 10 per cent cut on the contract price." They are saving the Navy money, so that they can very well afford to pay their salaries. So that it it only fair to say to you that 7 men out of our 61 men are not in a position to earn us any profits.

Mr. **Anderson**. Their salaries are not taken out of your appropriation, as I understand, so that would not cut any figure so far as the amount of work you can do is concerned.

Mr. **Sherman**. Except as it is a revolving fund. We spend it, and then it comes back; then we spend it again, and it comes back again, and so on.

Mr. **Wason**. Can you not spend it for somebody who is doing work for the Navy Department?

Mr. **Sherman**. Oh, yes; but we continue to pay those men this amount in salaries. They are on our pay roll, and our disbursing clerk pays them out of our appropriation every month, and the Navy every three months reimburses us, so that it is not costing anything in the long run.

Mr. **Wason**. I understand that. What do you do with that amount which they reimburse you every quarter?

Mr. **Sherman**. It goes right back into the general fund; it is transferred to our credit in the Treasury.

Mr. **Wason**. So that you can spend it for seven other men at those same salaries?

Mr. **Sherman**. Yes; we keep those seven men going all the time.

Mr. **Wason**. I am not talking about the men at the Navy; I am saying it does not reduce your personnel on this work.

Mr. **Sherman**. No; it only means that practically one quarter's salary, practically three months' salary, of these men, is always revolving and the Navy is always owing us that much.

Mr. **Magee**. You advance their salaries for three months, and then it comes back to you from the Navy Department?

Mr. **Sherman**. Yes.

Mr. **Magee**. It does not affect your appropriation?

Mr. **Sherman**. It does not affect our appropriation.

Mr. **Anderson**. Did I understand you to say you had 61 inspectors plus those seven, or that of the 61 seven are on the Navy's roll?

Mr. **Sherman**. This is our pay roll. We have 41 full-time inspectors, giving their time to the work for which the appropriation is made.

Mr. **Anderson**. What salaries do they receive?

Mr. **Sherman**. Their salaries range from $1,800 to $2,500 plus the bonus; that is, from $2,040 to $2,740. Now, that does not include two supervising inspectors whose salaries are higher. We have two supervising inspectors at $3,240, and one pathologist whom we are carrying (whom Dr. Taylor, of Plant Industry, has spoken to you about), at $3,240, and then we have four part-time inspectors whose salaries are carried jointly by this fund and the Market News fund. They are the men who report the market news in the morning, and whose assignment on the market news work does not take all day. They do that market-news work in the morning and then make inspections in the afternoon.

Then we have nine whose salaries are carried principally by the States; that is to say; they are essentially State men, but they also have appointments as Federal inspectors, because we have trained them.

They inspect for us when an interstate shipment is involved and for the State when it is an intrastate shipment. There are only two or three States which have laws under which that can be done. The best illustration of that is the man at Wilkes-Barre and Scranton, Pa., employed primarily for market news purposes by the State. He goes back and forth between those cities and reports the market. He goes to Scranton every other day and then he goes back. He also performs the duties of an inspector. When it is an interstate commerce shipment, he makes the inspection on behalf of the Government, and the fee comes to the Treasury and we pay a small part of his salary.

In addition to this there are 7 men employed by the Navy, making a total of 61 men who have something to do with this inspection service.

Mr. ANDERSON. Your estimate here shows 68, including inspector, clerk, and messenger boy.

Mr. SHERMAN. That would include the project leader and the two pathologists, would it not?

Mr. ANDERSON. The two pathologists; yes.

Mr. SHERMAN. And it includes an estimate for my own salary. It has been on this fund part of the time; I do not know where I am estimated for this time.

INSPECTIONS OF BUTTER.

I have not mentioned the butter item; I might say what is being done on butter work. The butter part of the work is entirely self-supporting, because it is handled largely by men who are employed on the dairy market news work, who give only part of their time to inspection, and the proportion of this fund which is allotted to butter inspection is more than covered by the fees from butter inspection.

Mr. ANDERSON. What is the amount allotted to butter inspection?

Mr. SHERMAN. $12,000.

Mr. ANDERSON. Where do you make butter inspections?

Mr. SHERMAN. The butter inspections are at New York, Philadelphia, Chicago, San Francisco, and Boston. That comes under a different division.

Mr. ANDERSON. Do you make any inspection of import shipments of butter or export shipments of butter?

Mr. SHERMAN. Only on request.

Mr. ANDERSON. Do you have any requests?

Mr. SHERMAN. That part of it is administered under the Dairy Marketing Division, and I am not sure. They must, however, because there are a great many institutions which buy altogether on their inspection, and I presume they buy foreign or domestic butter, according to which may appear to be the most advantageous at the time.

Mr. ANDERSON. Just what is the relation of this item to the dairy division?

Mr. SHERMAN. Not to the Dairy Division of Animal Industry, but to the project which deals with the handling and marketing of dairy products in the Bureau of Markets. We in the Bureau of Markets are on the commodity basis. The bulk of this is used for fruits and vegetables, so that comes in my division, which is the fruits and vegetable division. We are doing the market news work, and the work on grading and standards for fruits and vegetables. That part of this item used for the butter inspection goes to the Division of Dairy Products. While the men are in the same city offices they are not men who are under my direct supervision.

I have here a long list of the institutions which are buying on our butter inspection in Boston, and also in New York and Philadelphia—all the city institutions of Philadelphia.

Mr. ANDERSON. Does this inspection also include certifications as to grades?

Mr. SHERMAN. Yes; the certification is as to score. Now the dairy people are just ready to begin cheese inspection. You will notice the authority for cheese is carried in the item, but there never has been a cheese inspection. The standards which they think it is necessary to use have now been worked out, and, as I understand, within the next few months the same butter inspectors will be authorized to inspect cheese so far as requests may be received. It is not contemplated to put any additional men on for that work. There is, however, one man of the force we are carrying who is at Fond du Lac, Wis., who is maintained there all the time for the purpose of collecting and distributing information, who will inspect as far as he can under this item; but, if he can not inspect anything until it moves in interstate commerce he can not do very much, and there will be little demand on him for inspection.

Mr. ANDERSON. The standards for cheese, do they cover anything except the ordinary market varieties of cheese?

Mr. TENNY. Yes; they do.

Mr. ANDERSON. What do they cover?

Mr. TENNY. They cover what are known as the American manufactures of Swiss cheese. I do not know whether they cover more than that, or not; I know they cover those.

Mr. WASON. You say your inspectors certify to the grade of it; that is, they score it. That indicates the grade of it, does it not?

Mr. SHERMAN. Well, I think butter is usually sold as 89 score or 91 score, rather than by any specific grade name.

Mr. WASON. What does 89 mean?

Mr. SHERMAN. Eighty-nine means several points below the best.

Mr. WASON. What would be the best score you would give for the best product?

Mr. SHERMAN. I understand there is very little butter above 93 score, although you are questioning me outside of my own field.

Mr. WASON. I will reserve that question, then, until later on.

Mr. ROBB. Ninety-two, I think, is the standard on which most sales are made.

Mr. SHERMAN. I think I am correct in saying, however, that commercially speaking there is comparatively little butter above 93 score.

Mr. WASON. You mentioned 89 score; would that mean oleo?

Mr. SHERMAN. Eighty-nine score would not mean adulterated butter at all; it simply might mean that the butter was churned from cream which was not of the best flavor, and things of that sort.

Mr. ANDERSON. That would take in color and texture?

Mr. SHERMAN. Oh, yes; the score includes the elements of color, texture, and odor, as well as flavor—all those things which go to make up the table quality and keeping quality.

With reference to the hay item, the word "hay" also was inserted by Congress in the bill. It has been in the bill for two years, I think; I think we are in the second year in which we have had authority to inspect "hay and other perishable farm products," but no money was added to the item when the word "hay" was added. It was done without the suggestion of the department and before the department had the hay grades ready, so that nothing has been done up to this time. It is a fact, however, that those in charge of the work on hay standardization have worked out standards for timothy and clover hay and mixtures of timothy and clover hay and of their mixture with other grasses, which covers the commercial hay crop east of the alfalfa region. And they are ready now, if Congress desires the inspection of hay to be instituted, to do so.

INSPECTION OF HAY.

Mr. ANDERSON. How much additional money would be required to institute the inspection of hay?

Mr. SHERMAN. They estimate that an appropriation of $25,000 would enable the department to institute hay inspection in five cities, the five principal eastern hay markets. Three of them would almost certainly be New York City, Cincinnati, and Atlanta, Ga. As to which the other two should be, that is open to further investigation.

Mr. ANDERSON. I thought Kansas City was the largest hay market in the country.

Mr. SHERMAN. If we went into Kansas City and were not ready to inspect on alfalfa we would be up against real criticism, and we do not want to go into Kansas City until we have the alfalfa grades worked out, which are not quite ready now. But New York, Cincinnati, and Atlanta, Ga., are almost certain to be three of those points, and Chicago and St. Louis will probably be the other two.

Mr. WHEELER. As to the matter of Kansas City, the hay shipped into Kansas City is, to a large extent, jobbing hay purchased by buyers sent out by Kansas City dealers, but not shipped direct through Kansas City dealers, and there would not be the direct benefit at this time if we inaugurated inspection in the Kansas City market that there would be if the inspection was made in some other market. although Kansas City is one of the leading hay markets, and ultimately should have it.

Mr. SHERMAN. In connection with the hay inspection it should be pointed out that this limitation to shipments which have moved in interstate commerce will be particularly hampering, because in New York City you have such a very large proportion of New York State grown hay, and in Cincinnati, while you have a large volume of hay which will eventually go south of the Ohio River, much of it comes in as Ohio hay, and the inspection would be called for by those who ship it in, and who want inspection on it before it goes out. In St. Louis, also, they have an immense volume of Missouri hay. Of course, at Chicago you would have a relatively small volume of Illinois hay. But it so happens that the hay markets are placed in such a way that a limitation of inspections to interstate shipments would be, if anything, more hampering on the service there than it is on the service for fruits and vegetables.

SERVICE 50 PER CENT SELF-SUPPORTING.

Mr. BUCHANAN. Do you feel, if hay inspection should be inaugurated, that it would keep up the pro rata of receipts of five-sevenths of the appropriation made?

Mr. SHERMAN. That is purely a matter of conjecture. You can not always tell what people will do by the way they talk beforehand. There is a very great demand for hay inspection, and we know there are very great abuses of the trade to be corrected.

Mr. BUCHANAN. That is why I asked.

Mr. SHERMAN. We have had this experience with reference to the present inspection service, that we have put men in a new market where the inspection service was not before available, and they have been very busy men for a few months; for a few months there was lots of business. Then when the receivers found the Government certificates which were being issued on those cars which they turned down, were showing up their practices there was a very sudden diminution of the inspection work he has had to do. But we think he has performed a very valuable service. It is just like a good policeman on a beat; there is no more disorder on the beat; but it is just as well to keep him there as it was to put him there in the first place. So that the fact there is a great public benefit derived from this service should not be overlooked. The feeling of a good many of us is that if this service is 50 per cent self-supporting it is doing all that ought to be asked for it. We feel the hay work is a proposition which will bring in some money and may come up to five-sevenths of self-support.

In any year the volume of our regular business may drop off, because it is governed by the weather and the market conditions. If we have a long, hard, freezing spell in winter, and there is a lot of stuff in transit, we get a sudden increase in business. On the other hand, if we have a mild, open winter, business drops off 50 per cent in some markets. Therefore it largely depends on whether the winter is especially severe. The same thing is true in the summer, depending on whether in the peach and strawberry regions it is cloudy and murky or bright and breezy at harvest time. Brown rot and other diseases are worse in damp weather and make an increase in the inspection demands in those markets in which the commodities arrive, and if they have fine, bright, dry weather, which is unfavorable to fungii, the demand for inspections invariably drops off.

On the other hand, whenever a market is gradually ascending, and the receiver sees a profit in this car, even if it is not up to grade, it is a question merely of making a profit, and he takes it and sells it, just as quick as he can, and gets a profit out of it. However, if the market is declining, and he sees a loss on this car, no matter how good it is, he will ask the Government to make an inspection, sometimes without ever having looked at it. He simply sends word to our office that so many cars have arrived and he wants us to send a man down there and make an inspection, hoping the certificate will show something on which he can claim a deduction. So that a declining market increases our business and a gradually ascending market reduces the amount of our business. So that any year might show up to be a good year or a light year, so far as receipts are concerned, and yet it would not be any reflection on the quality of the service rendered. Of course the country is so large that these things have evened up so far, and this work has shown a steadily increasing percentage of self-support.

PATHOLOGISTS.

On the item for market pathology, which was discussed when the Chief of the Bureau of Plant Industry was before you, I want to explain that situation, for I think perhaps it was not quite clear to every member of the committee. We are carrying on this fund two market pathologists who are not themselves making any inspections of the commodity in the car, but who are used all the time to train our new men to identify the diseases which are the causes of the injuries which we find. We have had in this inspection service a turnover running as high as 40 per cent a year in the personnel. Now you will realize that is almost a hopeless handicap for those who are trying to administer the service effectively, and that has necessitated such a constant stream of new appointees that we have just one training class after another. And while you may get a man who comes from the Northwest and who knows the box-apple game thoroughly, he may not know anything about the citrus fruits and onions, and our inspectors have to inspect over 80 different commodities. You would not think there were so many different fruits and vegetables. It is not a question of different varieties, but there are over 80 different commodities which move in carload quantities in interstate commerce in the United States and which our men have to inspect on request. And so the best training our inspector can get, whether he is a graduate of an agricultural college or a man who has been trained in the trade for years, is to put him into Chicago and give him a short post graduate course of four or five weeks, and to let him go with the inspectors and see them inspect the stuff in the morning and, in the afternoon, attend a regular class where he receives instruction, and has regular examinations.

We put him through five or six weeks of intensive training, before we permit him to write a certificate. We have figured that the salary we are paying those men in the meantime and the salary of the instructors, and the interference with the work of the regular inspectors in taking these fellows along and training them in the regular work, represents an investment of about $400 we have in each man before he begins to write certificates which bring $4 apiece into the Treasury. And the service rendered by the Government has preeminence over every other service, because no certificate we have ever issued has ever been successfully challenged, and, because the service has that standing, the certificate usually forms the basis of settlement between the parties in interest without going into court.

Mr. ANDERSON. What is the reason for this large turnover?

Mr. SHERMAN. The reason for this large turnover dates back to the beginning of the war and before I was responsible for this service. They were working on the problem of the grading and standardization of fruits and vegetables, and there were quite a number of young men of the scientific-assistant class when the war broke out whose average salary was between $1,500 and $1,800. The inspection service came on practically with the war, or after the war was on (at least, after the European war had broken out), and those men, young as they were, were the best qualified men we had to throw immediately into this work. As I have pointed out to you a number of times, the item was thrown in as a surprise to us while the bill was in consideration in the Senate, and we had to prepare for it as quickly as we could.

The result was that among the very first men who went into this work were some of the low-salaried men, and that established the salary scale for the inspection service away below where it was possible to maintain it, and we have the difficulty that in every market where they go they see the trade hire men at much higher salaries, men who do not know as much as our men; so our men soon leave us to go into commercial service. So it has been a slow process to get the service up to where it has a reasonably stable force. We think we have reached that point now and we are now having a turnover which does not cripple us; but it keeps us continually looking after good men. The supervising inspector in New York has resigned, to take effect on the 15th of this month, to go into business with a produce broker in New York. He was getting $3,240. He came to us at $1,440 and has been promoted in the course of five years until he is now getting $3,240, but he is going to resign and go into business. The man in this service has the best advertising he can get with the big firms in the fruit and produce business. He issues certificates which may, in a single case, mean hundreds of dollars to them, and in the course of a year may mean thousands and thousands of dollars to them. They would not think of sending a man down to the terminal yards and trust his inspection of a carload of products, they would not think of employing a man to do that for less than $300 a month. That is the way they feel about our service. They say to us, "Just as soon as you get a man we begin to have some confidence in you lose him."

Mr. MAGEE. So far as the value to the shipper that attaches to the certificate is concerned, it comes from the fact it is receivable in all United States courts as prima facie evidence of the truth of the statements contained therein?

Mr. SHERMAN. That makes it of very great value. It would not begin to have the same value without that.

Mr. MAGEE. I suppose it would require pretty strong evidence to rebut the facts stated in such a certificate?

Mr. SHERMAN. The man who challenged the certificate would have to bring a preponderance of evidence to show it was wrong.

Mr. MAGEE. I do not see where you get much effective competition from outsiders when the statute contains that provision.

Mr. SHERMAN. Nevertheless, we do get competition, because as a practical matter a very small percentage of these cases are going into court anyway; they are going to be settled outside.

Mr. ANDERSON. Is there anything further on this item, Mr. Sherman?

Mr. SHERMAN. I did not finish the statement with reference to these pathologists. We have to have them to train our men, as I have stated. This is another case in which the research work had not preceded the service work, because the service work was precipitated on us before the basic research work had been done. So that as soon as we began to issue these certificates, as soon as we began to find out what the causes of these injuries really were, the pathologists found that an entirely new field was being opened up to them. A very pointed case was that of a rot which was found to be very destructive of cucumbers, causing tremendous losses in the market. When we sent samples to the pathologists and they first isolated the cause, they thought they had found something new. They found later that same disease had been described many years ago by a pathologist who had seen it as a very small speck on the leaves of the plants in Florida, but he dismissed it as of no commercial consequence because it did not affect the growing plants in any commercial degree. Yet that very same organism on the cucumber itself, under the conditions of storage and transportation, developed as a most destructive rot, and it was found afterwards it was a thing that yields to treatment in the field. But its economic significance would not have been discovered except through market inspection of the goods.

There is quite a field for research there which has not been developed, and if Plant Industry gets that appropriation which they have asked for they will relieve our funds of the salaries of these two pathologists, so that we will be able to employ two more men who will actually write certificates and earn some money for the Treasury, in place of these pathologists who are now paid out of this same appropriation. It would relieve us to the extent of the salaries of two men who make no inspections and increase our earnings to that extent. We do not allow these men to do any traveling or to make any field investigations, because I felt we could not justify that under an appropriation of this sort which was given to us for service. It was a matter of absolute necessity for us to have them for the instruction of our men; we had to do that much research work out of the service fund.

Mr. ANDERSON. If those men are turned over to Plant Industry work, how will you get that instruction?

Mr. SHERMAN. They will be detailed to us for instruction work, and I have Dr. Taylor's promise if they get that appropriation they will always be available to us to train new recruits whenever we need them. We are hoping to reduce the training of these new recruits to a twice-a-year proposition.

Mr. ANDERSON. Those men would also do research work, I take it, and work in the field?

Mr. SHERMAN. They would do some research work. In fact, one of the pathologists carried on our funds now was temporarily released from duty at Chicago last year. The Bureau of Plant Industry sent him on an extended trip to study a new disease known as potato leak, out on the Pacific coast. He made a scientific study, but from the market end. They issued him that letter of authorization, so that his travel expense was nor charged up to this fund, but only his salary and expenses while he was actually working for us.

MARKET NEWS SERVICE.

Mr. ANDERSON. The next item is on page 231, "For collecting, publishing, and distributing, by telegraph, mail, or otherwise, timely information on the market supply and demand," etc.

Mr. **Wheeler**. I am covering the Market News Service on farm products, including fruits and vegetables, live stock and meats, dairy and poultry products, hay, feed, and seed. The amount that was used during the current year is $390,160, which is the same as included in the estimates for 1923. The Market News Service work is one of the first lines of work, one of the first activities, undertaken by the old Bureau of Markets when it was known as the Office of Markets.

Approximately two years after the Office of Markets was created the first Market News Service work was undertaken on fruits and vegetables. This was started in May, 1915, by Mr. Sherman. It was followed, very shortly, by similar work on live stock and meats. In the Office of Markets this was one of the first lines of work started, because of the insistent demand that assistance in the way of information as to movement, prices, supply, and demand be given to producers and distributors of fruits and vegetables and other perishable farm products. At the present time the newly created State bureaus are meeting practically the same situation. One of the first things that is requested of these new bureaus in the States is that they conduct a market news service on certain commodities which may vary in the different States.

It happens that Market News Service work is one that is a concrete piece of work that can be undertaken, perhaps, without the intensive investigation that might be required for some other types of service work. This work was begun as a normal activity of the Federal Government. When it was still in its infancy, or about two years after it was first started, the war came on, and because of the real service that, up to that time, had been performed by the Market News Service, it was recognized that a great deal of good could be accomplished in the conservation and the prevention of waste of such products by developing a Market News Service on a very large scale.

The bureau was immediately requested to form a plan for the development of that service and very large appropriations were immediately made available for this service. As the service was developed during the war, the rapidity of the development made necessary by the emergency brought about some apparent inefficient service, just the same as in all other lines that were developed rapidly. The plans that were formiulated were formulated the same as they would have been on a normal or peace basis, but they were developed rapidly and developed along certain commodity lines beyond what would have been the gradual development of the service. It was developed the same as it would have been developed on a peace basis, only more quickly.

Immediately following the war the appropriations were curtailed because a large amount of the money that had been made available was included in the emergency funds. This made necessary a considerable curtailment of the service; not, however, as great a curtailment as might have been expected from the reduction of the fund; because, up to that time we had acquired much more experience in the handling of the Market News Service and had developed certain methods more efficient than we had before, and the experience of the several years prior to that time made it possible to maintain an efficient service.

During the war, the maximum leased wires operated under and by the Bureau of Markets News Service aggregated nearly 18,000 miles. The leased wires were reduced very materially following the war because of curtailment of the appropriations.

Mr. BUCHANAN. When were the appropriations curtailed? You had $113,000 in 1919.

Mr. ANDERSON. The original emergency appropriation, as I recall it, was something like $12,000,000, the so-called food stimulating bill.

Mr. WHEELER. In 1919, the regular appropriation bill provided for $254,000, while the allotment from the emergency fund provided $1,114,000, making an aggregate of $1,368,580.

Mr. BUCHANAN. Not in this bill.

Mr. WHEELER. No; that is a combination of the allotment from the emergency fund and the regular appropriation. In 1920 the regular appropriation provided $497,000, which was an increase of about $240,000 over the regular appropriation, but a reduction of nearly $900,000 from the combined appropriations that were available the year before. In 1921, $403,920 was included in the regular appropriation bill, and in 1922, $390,160 was included, which is the same amount as is included in the present estimates. The gradual reduction in the appropriations from 1920 to the present day has made necessary some changes, but, as I said before, the greater efficiency of the service and the experience we have gained by the several years' conduct of the service have made it possible to reach more nearly the extent of the service that we had immediately following the war.

TELEGRAPHIC MARKET NEWS SERVICE.

Mr. ANDERSON. What points now have a telegraphic market news service?

Mr. WHEELER. The leased wire covers about 2,700 miles. The farthest west points are Lincoln, Nebr., and Kansas City, Mo.

Mr. ANDERSON. You have not been able to restore the San Francisco service?

Mr. WHEELER. No; the Pacific coast service was discontinued about three years ago and it has not been reinstated. It would take a considerable increase in the appropriation to include the Pacific coast service. The points included now in the leased wire—I will give those that are included as Federal offices as well as those that are included because of cooperation with State bureaus of markets. They are, beginning in the East, Boston, Mass.; New York City; Trenton, N. J.; Philadelphia, Pittsburgh, Harrisburg, and Lancaster, Pa.; Washington, D. C.; Columbus and Cincinnati, Ohio; Chicago; Minneapolis; three points in Wisconsin, Madison, Waupaca, and Fond du Lac; three points in Missouri, St. Louis, Jefferson City, and Kansas City; and two points in Nebraska, Omaha and Lincoln.

Mr. ANDERSON. I suppose that some of the losses of funds, due to the elimination of appropriations made during the emergency, has been offset by State activities.

Mr. WHEELER. In a very small part. The State activities are helping out our work to a large extent by serving to increase the efficiency of the service in particular States. We have not been able in the national markets to materially reduce our appropriations because of this State service.

It is the aim of the Federal Bureau to provide a market news service on a national marketing basis, and we make a particular feature of covering those markets which are fundamentally national markets and not State markets. For example, New York City, Chicago, St. Louis, Kansas City, Omaha, and Minneapolis, would not be considered as markets belonging particularly to the States in which they are located, because the Market News Service in those States is as useful to the people in other States as it would be to the States in which those cities are located.

Mr. **Anderson**. Are the State services, then, more largely confined to the smaller centers?

Mr. **Wheeler**. The State services are not necessarily confined to the small centers, but they serve in taking information that is obtained over our leased wires, wherever such information is available, and combining it with additional State information and distributing it throughout the State. In order to put this service on the leased wires and give it to the States, we have to maintain practically the same national service that we have had in the past.

I can give one or two concrete examples of this. The State of Pennsylvania was one of the first to ask for a drop from our leased wires. This State finances this work at Harrisburg and Lancaster and drops are provided at those points. The State of Pennsylvania is unable to give us a great deal of information from those points that we feel comes within our national field; but their having information available that goes over our leased wires enables them to furnish it to the entire State of Pennsylvania. The Lancaster drop is provided particularly for the live-stock service; the Harrisburg drop is because of Harrisburg being the official center of the State bureau of markets.

Mr. **Buchanan**. How would Texas get this information going over the leased wire?

Mr. **Wheeler**. The only way that Texas could get it would be to have a leased wire extension into Texas. Probably such an extension would be from Kansaas City to Fort Worth or to some other Texas point. That extension was provided during the war, and both live stock and fruit and vegetable services were furnished to Texas on a national basis.

Mr. **Buchanan**. Then if they extended to Fort Worth and Dallas the State authorities would take it up there and distribute to other points?

Mr. **Wheeler**. Yes; there is a demand now for this service in Texas and we are at a loss to know just how to furnish the service they desire. The two branches of the State that have to do with marketing have gotten together and want to distribute the market news service in the State of Texas from Austin. We have a man now in Texas going over the question to see in what way we may be of service to them, although we can not see any very easy way at the present time without a leased wire connection into the State.

Mr. **Buchanan**. About what does that cost from Kansas City?

Mr. **Wheeler**. $24 per mile per year. I do not remember the mileage, but it seems to me it is something over 500 miles from Kansas City.

Mr. **Sherman**. During the war we not only had connection with Kansas City to Fort Worth and also to Houston, but from New Orleans we had market news going to both Houston and Fort Worth during the expansion when the war was on. It is 507 miles from Kansas City to Fort Worth and 325 from Fort Worth to Houston.

Dr. **Ball**. Then you would have to have three shifts of operators.

Mr. **Wheeler**. It requires at least two shifts of operators to obtain the full service. The commercial rate of the leased wires at the beginning of the war was $20 per mile. One-half rate was given to the Government for its service, making $10 per mile as the cost of the leased wire when it was first installed. When the Government took over the wires, the rate was increased to $24 a mile commercial, making it $12 a mile as the cost to the Government. Last July 1, the commercial rate for the Government was reinstated and we have had to pay the full $24 per mile since that time. That has made necessary a very serious reduction in our leased wire mileage since July 1.

Mr. **Buchanan**. There is no reduced rate now to the Government at all?

Mr. **Wheeler**. There is no reduced rate now to the Government we pay the full $24. The cost of the leased wires at the present time, for the present mileage, is between $67,000 and $70,000.

Mr. **Lee**. Did you not at one time have service into Atlanta, Ga., or some southeastern point?

Mr. **Wheeler**. Yes, we had service to Atlanta, Ga.; Jacksonville, Fla., New Orleans, and some other southern points.

Mr. **Lee**. That was during the war?

Mr. **Wheeler**. Yes.

Mr. **Lee**. And of course if we had that service restored, your reply to Mr. Buchanan would apply to Atlanta, Ga., also?

Mr. **Wheeler**. Yes. One of the desirable things, if such an extension were possible, would be to have a wire which would connect the State bureaus of markets of a number of southern States, starting from Washington and going through Virginia, the two Carolinas, Georgia, Florida, Alabama, Mississippi, and perhaps to Texas. Texas might better be reached from Kansas City, passing through Oklahoma City. If that wire were made available to those various State bureaus, each of those State bureaus would undertake the matter of disseminating the national information combined with State information.

Mr. **Lee**. It is necessary, then, for the States to cooperate, is it?

Mr. **Wheeler**. Unless we want to completely federalize the market news service. The market news service, as it was started, was wholly a Federal service. As it is conducted now, we are cooperating with any State, where we are in a position to extend cooperation with such State, in the handling of the market news service.

Mr. **Lee**. Are these other States cooperating with you where you have the service?

Mr. **Wheeler**. The States of Pennsylvania, Ohio, Wisconsin, Minnesota, Nebraska, and Missouri have definite arrangements to cooperate with us.

Mr. **Lee**. On a 50–50 basis?

Mr. **Wheeler**. It varies in different States, depending on the conditions in such State. We work very closely with the State of New

York, but have no arrangements for coupling the finances between the two.

Mr. **Anderson**. You do not mean to leave with the committee the impression, however, that they pay 50 per cent of the cost of the particular wire into their territory?

Mr. **Wheeler**. Not at all. The Federal wire is maintained as a Federal wire and we control all the operators on the wire. We do not allow the States to have their own operators, because we wish to have it controlled as a Federal wire. We simply give them the service. During the last year, a new development in the dissemination of information has been brought out, and that is the use of radio communication. That seemed to a good many, when it was first suggested, as possibly a joke; but is it not that. It is possible to adopt radio communication in the dissemination not only of market information but other types of information, so that this news could be carried to the farmers all over the country. This would necessitate high-powered Federal radio stations and a considerable expansion in the present Government stations. Because of the confusion in the organization of the Government radio services at the present time, the Department of Agriculture has not undertaken to extend the Federal market news service by the use of the radio, except to use such Government stations, or other commercial, State, or private stations as might be offered or available for that purpose.

RADIO COMMUNICATION.

In this connection, I may say, perhaps a little aside from this particular item, that radio communication to the farmer is perhaps one of the most important methods of communication that is available to him. It will serve, as will no other method of communication, to bring information to him not only of the markets but reports on the weather and all other types of information that he should have available, and it will bring it to him promptly and effectively.

Mr. **Anderson**. Are you talking now about the radio telegraph or the radio telephone?

Mr. **Wheeler**. I am talking about both. The radio telegraph is almost necessary for long-distance communications. The radio telephone is the more practical means of carrying information to the farmer, because the farmer is not going to learn the continental code in order to get this information. Several of the States are undertaking now to disseminate information received from our leased wires by radio telephone, and we are using a number of stations—commercial and private stations, as well as State stations that have radio telephone transmitting equipment—to disseminate the market information. There are commercial stations now located at Pittsburgh, Chicago, Cincinnati, and Kansas City that are disseminating our service free of charge. They of course get their compensation by the increased sale of radio equipment. But we supervise every service that is given out in that way, so as to see that it is given out correctly.

DAILY QUOTATIONS.

Mr. **Buchanan.** Your service does not involve any more information than is contained in the daily quotations, does it, and the only advantage of it is that it gets there quicker?

Mr. **Wheeler.** It depends on the commodity you are referring to. The commercial quotations on commodities such as grain and live stock are available in a great many points, and we do not have on grain a special reporting service. Our special telegraphic services are fruits and vegetables, dairy and poultry products, and live stock and meats. Our services are much more extensive and much more comprehensive than any of the commercial services. In fact, wherever you see live-stock quotations to-day of the Chicago, Kansas City, Omaha National Stock Yards, or the South St. Paul market, even though they may not be so labeled, they are usually provided by our bureau. These quotations really have their origin at our reporting offices.

Mr. **Buchanan.** One service is about commensurate with the other so far as staple products such as live stock and things of that kind are concerned; they contain about the same information, do they not—the commercial service and your service—the actual sales of stock, whether they are heavy or light, or corn fed or not corn fed, and the price—that is about all those reports contain.

Mr. **Whalin.** Our quotations are on the basis of certain definite standard grades. The commercial quotations are not on those grades, and therefore they are not comparable to our service. Ours are the same throughout, whereas each market paper has a different standard of its own.

MARKET REPORTS PRINTED IN DAILY PAPERS.

Mr. **Wason.** Following your answer, I have one of your market reports which appeared in the Washington Post under date of January 14. It is dated:

> UNITED STATES BUREAU OF MARKETS.
>
> Chicago, *January 14.*
>
> *Cattle.*—Receipts, 1,000 head; compared with week ago, beef steers and fat she stock, 15 and 25 lower; bulls steady to 15 lower; canners and cutters about steady; veal calves, steady to 25 higher; stockers and feeders, 25 and 35 higher.

How much information would that give me if I did not have the market price of the week previous in my pocket, if I happened to be traveling and wanted to know—I was selling beef?

Mr. **Whalin.** That is information given out by the Associated Press, taken from the reports issued by us. Our reports are more in detail. They did not give the full information contained in our reports as we issued them. They just picked out the principal points.

Mr. **Wason.** From this report, can you proceed to tell the committee what the price is?

Mr. **Whalin.** They have not given any price standard here: I can not compare it.

Mr. **Wason.** Does your bureau allow the papers to publish information in that form, and accredit it to the Bureau of Markets?

Mr. **Wheeler.** We furnish the reports to the papers just as we issue them, and some of the reports for the use of the papers are compiled in our bureau. Other reports may be gotten up from information taken from our reports, and they would give us credit, but reduce them so that the information is not complete. I do not know that we have any particular control over the information that is used by the newspapers.

Mr. Wason. Well, I am not asking that. This Bureau of Markets, if it is worth anything (and I am not questioning that part), is to furnish information to the agriculturists as to farm products in a form they can understand as to what they sell from day to day, is it not?

Mr. Wheeler. Yes.

Dr. Ball. The information that they furnish gives the actual price.

Mr. Anderson. They actually furnish these, too, in just the form it is there. That is the way the newspaper prints it. It is just as easy to say $12.25 and $12.50 to-day as it is to say 25 higher. I have seen a great many of these things myself, and in every case in which you have to take that tail end of the report—that is what that is—you have to go back three or four pages or two or three pages and look at the rest of it to see what it means.

Mr. Wheeler. Ordinarily, Mr. Chairman, the summary that is prepared for the Associated Press contains the prevailing prices of the commodities as near as it is possible to give them and the comparison with the day or week previous. Of course, it is what the Associated Press will use. They will use only about 125 words from Chicago, and it is impossible in that number of words to give the prices for the 27 or more different classes of live stock that are handled and quoted in our detailed quotations from the Chicago market.

Mr. Magee. The point is that you might better give some information than none?

Mr. Buchanan. In other words, a person reading this would say, "Beef cattle 25 cents higher, or lower, than yesterday, or a week ago," but what is the use of saying they were higher or lower when they do not know what the price is from that quotation, and yet they say that comes from the Bureau of Markets.

Mr. Wheeler. Is not the regular price included in the report, and after that the day's quotations?

COPY OF TELEGRAPHIC REPORTS SENT OUT.

Mr. Whalin. Here is a copy of the telegraphic report we send out. That gives the local prices by grades.

LIVE-STOCK MARKET REPORT.

United States Department of Agriculture,
Bureau of Markets and Crop Estimates,
Chicago, February 8, 1922.

Hogs.—Estimated receipts to-day, 18,000; holdover, 8,168.

Market slow, steady to 10 cents higher than Tuesday's average. Now mostly steady. Big packers holding back. Pigs mostly 10 to 25 cents lower. Bulk desirable, $9.50 to $9.75. Average cost Tuesday, $9.48; weight, 238 pounds.

Bulk of sales, $9.20–$9.75	$10.05
Heavy weight (250 pounds up), medium, good, and choice	$9.15– 9.40
Medium weight (200–250 pounds), medium, good, and choice	9.35– 9.90
Light weight (150–200 pounds), common, medium, good, and choice	9.75–10.05
Light weight (130–150 pounds), common, medium, good, and choice	9.75–10.05
Packing sows (250 pounds up), smooth	8.25– 8.75
Packing sows (200 pounds up), rough	8.00– 8.40
Pigs (130 pounds down), medium, good, and choice	9.25–10.00

Cattle.—Estimated receipts to-day, $7,000.

Market opening slow. Beef steers and she stock steady to strong. Early top yearlings, $8.75; good matured steers, $8.65. Veal calves, bulls, stockers, and feeders steady.

Beef steers:	
Medium and heavy weight (1,100 pounds up)—	
Choice and prime	$9.00– $9.85
Good	8.10– 9.00
Medium	7.00– 8.10
Common	6.10– 7.00
Light weight (1,100 pounds down)—	
Choice and prime	8.85– 9.65
Good	7.85– 8.85
Medium	6.75– 7.85
Common	5.85– 6.75
Butcher cattle:	
Heifers, common, medium, good, and choice	4.35– 7.75
Cows, common, medium, good, and choice	4.10– 6.25
Bulls, bologna and beef	3.65– 5.75
Canners and cutters:	
Cows and heifers	2.75– 4.10
Canner steers	2.50– 4.35
Veal calves:	
Light and medium weight, medium, good, and choice	7.00– 10.50
Heavy weight, common, medium, good, and choice	4.00– 7.50
Feeder steers:	
1,000 pounds up, common, medium, good, and choice	5.25– 7.00
750–1,000 pounds, common, medium, good, and choice	5.15– 7.00
Stocker steers, common, medium, good, and choice	4.50– 6.85
Stocker cows and heifers, common, medium, good, and choice	3.40– 5.00

Sheep.—Estimated receipts to-day, $10,000.

Market, killing classes strong to 25 cents higher. Fat lamb top to city butcher, $14.50; packers, top, early, $14.25; others held higher. Good Idaho's, $13.75; fat ewe top early, $7.60; others, $7.25 down.

Lambs (84 pounds down), medium, good, choice, and prime	$12.50–$14.50
Lambs, culls and common	12.25
Yearling wethers, medium, good, choice, and prime	10.00– 13.25
Wethers, medium, good, choice, and prime	6.75– 9.75
Ewes, medium, good, and choice	5.25– 8.00
Ewes, culls and common	2.50– 5.00
Feeding lambs, medium, good, and choice	11.00– 13.00

Above quotations are for wooled shorn offerings.

Mr. **Wason**. You furnish that to the newspapers?

Mr. **Whalin**. Yes, sir.

Mr. **Wason**. That paper I have shown you is printed right here in Washington and under the eaves of your bureau, and yet you have not said a word about them garbling your report and publishing a three or four line item of the Chicago market quotations under your name, as it is there. I have been reading that paper and trying to find out what the price of beef is in the principal markets of the United States for the last month, and I have not been able to do it. I found out another way though—not from the Bureau of Markets. I wrote up and communicated with a dealer in my country, and in five lines he told me what the prices were.

Mr. **Wheeler**. Our newspaper reports are in brief form and have to be reduced to brief form. This is a summary.

Mr. **Wason**. I am talking about the farmer who gets his information from the newspapers of the country, and I take it here is a sample of what purports to be information furnished by you which is printed right here in Washington, almost across the street from you, a month ago, and it gives no information. How do you expect the man this service is intended to benefit finds out about it?

Mr. **Buchanan.** One question as to the utilization of the newspapers. The Associated Press and other agencies disseminate your information. They are glad to do it, because it is interesting to the reading public, or the readers of their papers, and why can not you start on a proper basis in making up this summary and, in that summary, include the different prices of the different characters of stock?

Mr. **Wheeler.** I shall read one of the summaries as we make it out for the use of the papers. I will give just one paragraph covering cattle:

> Cattle receipts, 8,000: beef steers uneven, mostly steady; top, 9.25; weight 1,436 pounds. Bulk beef steers, 6.75 and 7.85. Stockers and feeders strong to 15 cents higher. Bulls weak to 15 cents lower. Calves steady.

Mr. **Buchanan.** That gives it only on one basis. It doesn't tell the price of she stock. It says 15 cents higher.

Mr. **Wheeler.** If we could prevail upon the newspapers to publish our complete detail quotations, as we give them, it would be satisfactory to you.

Mr. **Buchanan.** You can certainly say that they must do that or else stop them giving credit for these reports to the United States Bureau of Markets, because it brings your bureau into disrepute. They have got no right to misquote the Bureau of Markets or to leave out important facts.

Dr. **Ball.** That report there would give all of the information that I would need.

Mr. **Wason.** That may be, because you keep informed on it every day, but the farmers don't do it that way.

Dr. **Ball.** Well, I think that a farmer who has hogs ready to go to market or the man that has live stock ready to go to market usually has a pretty definite knowledge of that market from day to day, and what he wants is just the trend of the market. If they are going to limit the report to 125 words, a farmer would a good deal rather have the trend of a number of different things than the quotations on a number of them.

Mr. **Buchanan.** Well, I have been a farmer, and you can not lepend on your memory. A farmer will see a paper to-day or last veek or the day before yesterday, and then he will see another one o-day "25 cents higher." Then he would have to go back and hunt ıp the old paper which he had probably lost or burned up in kindling fire, and he would not know and would not remember all these lifferent things.

Dr. **Ball.** Every farmer takes a farm paper which gives the narket quotations in great detail; much more so than the daily press vould carry.

Mr. **Buchanan.** There is no question about that, but I am talking bout this standard business.

Mr. **Lee.** About 1 farmer in 25 takes a farm paper, or 1 in 50.

Mr. **Buchanan.** I doubt it, I doubt if there is one in a hundred.

Dr. **Ball.** One farmer in a hundred who takes a farm paper?

Mr. **Buchanan.** Yes.

Mr. **Wheeler.** I haven't the figures compiled on that matter here, ut I would like to incorporate a statement in the record, if I may.

Table showing number farmers taking agricultural papers, taken from page 18, Circular No. 117, Bureau of Plant Industry, issued Mar. 15, 1913.

Section.	Farmers visited.	Taking farm papers.	
		Number.	Per cent.
North Atlantic States	1,285	893	69.5
Southern States	1,001	454	45.4
North Central States	707	534	75.5
West Central States	705	542	76.9
Total or average	3,698	2,423	65.5

Mr. LEE. They would not get much news out of the daily paper.

Mr. ANDERSON. Of course, there is a wide difference in the amount of market news carried in the daily papers. Some papers carry very extensive market quotations on wheat and others very extensive market quotations on live stock, and I presume the southern papers carry very extensive quotations on cotton. I do not imagine that in the East they carry any very great amount of market news, particularly a Washington paper. You would find a good deal upon the curb market and the state of the market on stocks and bonds.

MARKETGRAM SERVICE.

Mr. WHEELER. The bureau conducts a service which was started a little over a year ago for the particular use of the farm papers, and the weekly small-town papers that reach the country districts. This is known as our marketgram service. We prepare on Mondays, Wednesdays, Thursdays, Fridays, and Saturdays of each week a summary of the week's markets for the week ending on the day that the report is prepared. This report is prepared in Washington from all the data available from the leased wires connecting all of our market offices and is placed upon the leased wire in summary form between 3 and 4 o'clock in the afternoon. It is mimeographed in our field offices and distributed to newspapers, banks, or any institution or individual who is in a position to extend that service to others.

This Marketgram service summarizes grain, fruits and vegetables, hay, feed, dairy products, live stock and meats, and cotton. This service is furnished now to about 1,700 papers and other extension agencies where it is used in extending the information to other people.

I would like to read into the record the Marketgram for the week ending February 1.

WEEKLY MARKETGRAM.

UNITED STATES BUREAU OF MARKETS AND CROP ESTIMATES,
Washington, D. C., February 1, 1922.

Grain.—Market firm during the week and prices closed higher; Chicago May wheat advanced 4½ cents net, closing at $1.19½; Chicago May corn up one-half cent at 54 cents. Principal market factors were strength in foreign markets, bullish reports of farm reserves and crop conditions, and fair export business. Movement of corn to terminal markets during January largest on record. Closing prices in Chicago cash market: No. 2 red winter wheat, $1.26; No. 2 hard winter wheat, $1.17; No. 2 mixed corn, 49 cents; No. 2 yellow corn, 49 cents; No. 3 white oats, 35 cents. Average farm prices: No. 2 mixed corn in central Iowa, about 35 cents; No. 1 dark northern wheat in central North Dakota, $1.17½; No. 2 hard winter wheat in central Kansas, $1. For the week Minneapolis May wheat up 4 cents closing at $1.17½; Kansas City May wheat up 3 cents at $1.09⅛; Winnipeg May wheat up 3½ cents at $1.16.

Fruits and vegetables.—Potato prices weakened during the week and Northern sacked Round Whites dropped 10–20 cents in producing sections at $1.60–$1.80 per 100 pounds; Chicago carlot market down 15 cents at $1.70–$1.85. Eastern sacked Round Whites steady f. o. b. western New York points at $2.05–$2. 10; steady in New York City and Philadelphia at $2.35–$2.45. Maine Green Mountains down 5–10 cents at distributing points at $1.56–$1.66 per 100 pounds bulk. Sacked stock down 10 cents in Boston at $2.15–$2.25.

Cabbage markets slow and dull at lower prices. New York and Northern Danish type stock down $5 to $10 in most wholesale markets at $35 to $45 per ton bulk, reaching $50 in Pittsburgh; prices in western New York held at $35. Texas Early Flat type down 25 cents in Chicago and Knsas City at $2.75 to $3 per per 100 pounds bulk; down $10 in St. Louis at $35 to $40 per ton.

Celery markets irregular. Chicago slow and weak; New York strong. Florida stock steady in New York and Philadelphia at $4.50 per 10-inch crate; down 75 cents in Chicago at $4.25 to $4.75. California stock up $1 in New York at $10 to $11 per crate; firm in Pittsburgh at $9 to $10.50; steady in St. Louis and Kansas City at $9 to $10; down $2 in Chicago at $7.50 to $8.

New York Baldwin apples slightly higher in eastern cities at $7.50 to $8 per barrel. Michigan stock up 50 cents in Chicago at $7.50 to $8. Northwestern extra fancy boxed Spitzenburgs firm in New York at $3.25 to $3.50; weaker in Chicago at $2.50 to $2.75; steady in Philadelphia at $2.75 to $3. Extra fancy Jonathans firm in Chicago and Kansas City at $2.75 to $3.25. Extra fancy winesaps sold at auction in New York at $2.50 to $3.85.

Hay.—Market continues dull generally. Receipts are not large except in one or two markets, but equal to the limited demand. Poorer grades sell slowly. Prices practically unchanged. Rain in central west and snow in east curtailing movement. Quoted February 1: No. 1 timothy—New York, $27.50, Philadelphia $23, Pittsburgh $21.50, Cincinnati $20.50, Chicago $22, Minneapolis $17.50, Memphis $22. No. 1 alfalfa—Memphis $25, Minneapolis $21. No. 1 prairie—Minneapolis $15, Chicago $16.

Feed.—Markets generally firmer on improved demand. Wheat feeds advanced on reported short covering by Minneapolis jobbers. Substantial sales of January–February shipment bran and middlings to jobbers were made by Minneapolis and southwestern mills. Cottonseed meal prices firm, sales light. Linseed meal slightly easier on freer offerings. Gluten and hominy feed unchanged. Demand for corn feeds light in most sections. Alfalfa meal and beet pulp steady. Receipts and movement good. Quoted February 1: Bran $20.50, middlings $20, Minneapolis; gluten feed $32.15, Chicago; white hominy feed $19.75, St. Louis; No. 1 alfalfa meal $16.75, Kansas City; 34 per cent linseed meal $43, Minneapolis; 36 per cent cottonseed meal $34.50, Memphis.

Dairy products.—Butter markets barely steady. Prices were fairly well maintained through the week, but there were occasional evidences of weakness, New York declining one-half cent to-day. Best trading on top grades. Closing prices, 92 score: NewYork and Philadelphia 38½ cents, Boston 38 cents, Chicago 37 cents.

Cheese markets steady; prices show slight advances in Wisconsin and business is fairly active. Distributing markets quiet; dealers pushing sales, especially on fresh cheese. Prices in Wisconsin primary markets January 31: Twins, 20 cents; Daisies, 20¾ cents; Double Daisies, 20½ cents; Young Americas, 21 cents; Longhorns, 20¾ cents; Square Prints, 23½ cents.

Live stock and meats.—Chicago cattle and hog prices advanced during the week, while sheep and lamb prices were weak to lower. Hogs ranged from 25 cents to 50 cents higher per 100 pounds; beef steers and butcher cows and heifers up 10 cents to 35 cents; feeder steers firm to a shade higher. Veal calves weak to 25 cents lower. Fat lambs, yearlings, and fat ewes weak to 25 cents lower; feeding lambs unchanged. February 1 Chicago prices: Hogs, top $9.25 (one load); bulk of sales $8.75 to $9; medium and good beef steers $6.75 to $9.15; butcher cows and heifers $4 to $7.65; feeder steers $5.15 to $6.85; light and medium weight veal calves $7.75 to $11.25; fat lambs $11.75 to $14; feeding lambs $10.50 to $12.75; yearlings $9.50 to $12.75; fat ewes $5 to $7.75.

Stocker and feeder shipments from 12 important markets during the week ending January 27 were: Cattle and calves, 55,026; hogs, 3,074; sheep, 28,371.

Generally speaking, eastern wholesale fresh meat prices were unchanged. Light pork loins weak to 50 cents lower; heavy loins generally 50 cents higher. February 1 prices good grade meats: Beef, $12 to $14; veal, $18 to $22; lamb, $25 to $27; mutton, $12 to $16; light pork loins, $16 to $18; heavy loins, $12 to $15.

Cotton.—Spot cotton prices declined 56 points during the week, closing at 16.02 cents per pound. New York March futures declined 20 points, closing at 16.85 cents.

Mr. **Wheeler** (continuing). That is the kind of a summary that we prepare for the use of farm papers, mostly the weekly papers, and it gives the trend of the market, and as near as possible the prices.

Mr. **Buchanan**. Why couldn't you prepare the same for the daily papers?

Mr. **Wheeler**. We do, as nearly as possible.

Mr. **Buchanan**. The ones you got did not give the prices at all. It is just as easy to give the prices as to give some of that other information there. Here is a Representative here, a member of this committee, Mr. Wason, he is engaged in the farming business. He can not get from these daily papers the quotations on the price of stock.

Mr. **Wheeler**. It is a problem. We have had this situation to face with the daily papers. They wish to publish only a limited report.

Mr. **Buchanan**. Oh, yes; they would not object to giving the prices. That is too small. As to beef, the prices of it, 25 cents and up.

Mr. **Wheeler**. What would you mean by beef?

Mr. **Buchanan**. Steers, corn-fed steers, so much, or whatever classification you give them in there. She cattle so much; 25 per cent lower or higher, but give the prices at which they are sold on that day per pound.

Dr. **Ball**. Now, if Mr. Wason did not know anything about the market, would he know whether the market was up or down?

Mr. **Buchanan**. You could say also whether it is up or down. You could put this information here also, but what he wants to know is, "What can I get for my cattle? What is the Chicago market?" That is the principal thing he wants when he is ready to sell his stock.

Dr. **Ball**. Of course, if the inference is that that is all the information he has, he has no information.

Mr. **Buchanan**. Well, you can give them both. It is just a few more words.

Dr. **Ball**. But our service gives a great deal more than that; so much more that they won't print it.

Mr. **Wason**. I read to you the service out of the leading newspaper here.

Dr. **Ball**. No; it is not our service.

Mr. **Wason**. Well, it is printed with your authority. As far as I have been able to learn from you gentlemen here, you have not objected to it appearing that way. In my innocence I supposed that is your report. I have a right to believe that it is, and I have a right to place confidence in it.

Mr. **Wheeler**. Here is a copy of the report. We prepare this for the newspapers. This is taken from the Washington Post February 9:

LIVE STOCK MARKETS.

UNITED STATES BUREAU OF MARKETS,
Chicago, February 8.

Cattle.—Receipts, 7,000; beef steers and she stock, steady to strong; spots, higher; quality, plain; top, 8.75 for 590-pound yearlings; top, heavies, 8.65; bulk beef steers, 6.75@7.65; bulls, stockers and feeders, steady; veal calves, steady to 25 higher.

Hogs.—Receipts, 18,000; steady to 10c higher than Tuesday's average; close, lights, strong; others, slow, about steady; shippers bought about 5,500; hold over, moderate;

mostly heavier weights; top, 10.10; one load sorted 180-pound averages; bulk lights, 9.85@10.00; bulk, others, 9.20@9.75; pigs, mostly 10 to 25 lower; bulk, desirable, 9.50@9.75; few choice up to 10.00.

Sheep.—Receipts 10,000; killing classes, strong to 25 higher; feeders, steady; fat lambs, top, 14.50; bulk desirable kinds, 13.75@14.25; good clippers, 13.00; fat ewe top, 8.00; bulk desirable kinds, 6.75@7.25; light feeder lambs, 12.25@12.75.

Mr. WASON. That was from the Washington Star, January 24, that I read.

Mr. WHEELER. That report must have been culled and the prices taken out.

Mr. WASON. How did I know that?

Mr. WHEELER. The information, as far as it was given, probably was correct, was it not? As far as they quote it from our report it was correct?

Mr. WASON. I should think so, because the information was nil. Nobody would take the pains to find out whether it was correct or not.

Dr. BALL. That is all the information I would have needed if I had a bunch of steers coming up to market. I would have been watching the press of the Chicago market every day.

Mr. ANDERSON. Where would you have been watching it if that is all the newspaper that you took?

Dr. BALL. If I was in a country where they were producing steers, my newspaper would have the full detail of the market.

Mr. ANDERSON. You might have been getting it by radio or something like that, too.

Dr. BALL. You can not blame us because the Washington papers do not want to publish all of our reports.

Mr. BUCHANAN. I do not believe that we should permit the Washington papers or any other papers to cull out your reports like that and only publish part of them.

Mr. WASON. I am not blaming you except in that particular. That is published and any person here, any stranger buys it, and he buys it as being a report of the Bureau of Markets. Not one of you, as far as I have been able to learn up to this time have informed the publishers of that paper that they are garbling your reports. When a man lies about me I usually get word to him that he has made a mistake.

I want you to understand that that is just a sample of the situation that I have been noticing recently. I am not blaming your bureau, I am simply blaming the service and calling attention to criticism that may be heaped against your bureau by people who think that is your report. I hope you do not think that I think that you intelligent gentlemen would prepare a report like that, knowing that it was published in that way.

Mr. WHEELER. A great difference will be seen in the reports in the same paper at different periods. If a paper is filled up with election returns or any other type of information such as the Armament Conference or other things, you will find that the reports may be greatly reduced—more so than under normal conditions.

Now, I have not seen all the reports that have been published in the Washington papers, but as I come down in the morning I usually look at the market page to see what live stock markets have been quoted as coming from our bureau, and as far as I have observed those reports I do not think I have seen any that have failed to give the prices. I have not watched the Star as carefully as I have some of the morning papers. Those I take from the morning papers were similar to the one I read to you, and they are identical with the daily report as I have observed it in the Post, as it has been given each morning.

Mr. **Anderson.** When are those reports issued? In time for the morning papers?

Mr. **Wheeler.** We give out two press reports or more a day; one for use of the evening papers, which would be the one that the Star would have, and one later in the day, giving the complete day's markets for the Associated Press for the morning papers, and this is a sample of the type of Associated Press report. We are furnishing it to them rather than having them write it themselves, because we feel we can give a more accurate statement in that way than to have them take our report and rewrite it. They do sometimes take our report and make up their own.

Mr. **Wason.** The report that I called your attention to on January 24 last, do you think that that is of any benefit whatever, unless a person has a daily file of prices at his hand?

Mr. **Wheeler.** Yes, I do.

Mr. **Wason.** I wish you would show me in what way.

Mr. **Wheeler.** I think the trend is of considerable importance, as well as the actual price. In fact, some people would prefer to have the trend rather than the actual price.

Mr. **Buchanan.** You will admit that if that quotation carried the price and the trend it would be more valuable than it is now.

Mr. **Wheeler.** It would; certainly.

Mr. **Buchanan.** Then we are together on that. Now, can't you gentlemen try to inaugurate a service and have it that way? Just let me show you the position that you put us in. We make this appropriation to carry on this service, and of course it is known throughout the country that we do make this appropriation for the benefit of this service. We go home, and a constituent walks up to us and shows us that thing, and he says, "What can I tell from this unless I make it my business to keep up with the market every day?" Why can't you gentlemen try to make it complete and harmonious?

Mr. **Wheeler.** Of course, if we were paying advertising rates for the space in the paper, we could control the information.

Mr. **Buchanan.** You can control it anyway.

Mr. **Wason.** You can make that paper refrain from publishing your report unless they publish it verbatim, or else put in parentheses, where it says United States Bureau of Markets, "excerpts from the Bureau of Markets."

Mr. **Wheeler.** I think perhaps that could be done.

Mr. **Buchanan.** You can do this, too. You can say, "Gentlemen, you can carry these reports if you will carry the basic price of this stuff. Otherwise we will not furnish them." They will put it in there.

Mr. **Wheeler.** One of the three outstanding improvements in our service the past year has been the extent the newspapers have handled our reports. We have increased the use of our reports by the newspapers very materially during the past year. I will say that not in all cases have our reports been published just the way we would like to have them, but I think that in 99 per cent of the cases they have given our reports just as we have prepared them, and have given them accurately. It is very difficult for us to operate a police service on the newspapers to require that the reports be given exactly as we prepare them.

Mr. **Buchanan**. That is nothing particularly more for them to publish. There is just that one basic fact—the price of the stuff. You can not tell me that a newspaper, or even the Associated Press, will object to giving the basic fact—the primary fact, the price of the commodity. They won't object to that.

Mr. **Wheeler**. The report as we prepare it covers somewhat over 27 items.

Mr. **Buchanan**. I am not talking about the entire report. I am talking about this little short report. It will add but a few words so as to give the basic price of those cattle, for instance. They will not object to that. It is the primary news that they want. They will not object to it, if you ask them to do it.

Mr. **Wason**. Don't you think that if you shortened up your reports and made them a little more to the point, it would facilitate the use of them a little more by the average newspaper?

Mr. **Wheeler**. The classifications of live stock in particular—I am referring to live stock because I happen to have that report before me—are necessarily quite complicated, and if we should give from this report the price of hogs from $7.50 to $9.25, $9.25 representing the maximum price of any grade and the $7.50 the lowest, would mean as much to the man as to give him one or two classes and give him the trend of the market?

Mr. **Wason**. That would depend upon the man, upon his education and his experience.

Mr. **Buchanan**. Why can't you say hogs $7.50 and $9.25? Twenty points higher. That is the complete information.

Mr. **Wheeler**. That is very much what we do give in our newspaper reports.

Mr. **Buchanan**. And that is just what I want to insist on that you publish hereafter.

Dr. **Ball**. Put a proviso in here that no newspaper shall publish this unless they give the basic price.

Mr. **Buchanan**. And that they shall not credit it to the Bureau of Markets unless they do give it.

Mr. **Wason**. If we put that in, will your department see that it is strictly enforced, Dr. Ball?

Dr. **Ball**. Well, we will have to refer that to our legal department.

Mr. **Anderson**. Well, gentlemen, let us get along.

COOPERATION OF STATES IN EXTENSION OF MARKET NEWS SERVICE.

Mr. **Wheeler**. I have mentioned that during the past year our progress has been along the lines of making our service more efficient with the funds that we have available and that there were three principal ways that we have extended our service; one is by endeavoring to get our reports into the newspapers, which was no easy task. Another is cooperation with the States in the extension of our market news service. The third is the utilization of radio communication in the dissemination of market reports.

Mr. **Anderson**. Has there been any change in the character of information, with reference to the fruit and vegetable service?

Mr. **Wheeler**. Practically all of the market news services are conducted now in much the same way that they were a year ago. It would only be repeating some of the details to go into the detail of all the services.

Mr. **Anderson**. You still maintain in the fruits and vegetables service your telegraphic news service, with reference to receipts at different markets and all that sort of thing?

Mr. **Wheeler**. We do. You refer to the service that the railroads give us. We receive reports from 474 railroads in the country every morning as to the shipments originating on those railroads the previous 24 hours, and we also get additional information as to both shipments and receipts at those markets at field stations that we are operating on the fruit and vegetable service.

Would you like to have me go into a description of the different services, Mr. Chairman?

Mr. **Anderson**. Not unless the other gentlemen wish to have it. I have heard it before.

Mr. **Wheeler**. It would be much the same as what has been given before.

LEASED WIRES.

I think I stated one change in the restriction of the leased wire last July, because of the double cost of the leased wire per month.

Mr. **Buchanan**. Is there any opportunity of your securing the Government rate on those leased wires? Have you taken that up with the companies?

Mr. **Wheeler**. Those matters have been taken up from time to time. Most of those matters are taken up through the Post Office Department and the Interstate Commerce Commission.

Mr. **Buchanan**. If they gave us a reduced rate of 50 per cent for Government business on the wholesale before the war and during the war, it seems to me like it is an extraordinary and unusual increase to require the full payment now.

Dr. **Ball**. But this was not before the war.

Mr. **Wheeler**. It was given after the opening of the war, as a war emergency measure.

Dr. **Ball**. It was given as a war emergency measure. They came down and explained the whole matter.

Mr. **Buchanan**. This service was not in force prior to the war, was it?

Mr. **Wheeler**. This leased wire service was not in force prior to the war. I think we did have the leased wire but only in an experimental way between here and Boston. Our leased wire service on a national scope started practically at the opening of the war. If we could have a better rate, and if we could include our Pacific coast and Southern points, we could conduct a real national reporting service. As it is now, our leased wires do not extend south of Cincinnati or St. Louis and do not extend west of Lincoln, Nebr., or Kansas City. They cover some of the most important market centers of the country, however.

Mr. **Buchanan**. Do you know of any business enterprises that have a leased wire similar to this?

Mr. **Wheeler**. The large packers have leased wires more extensive than ours.

Mr. **Buchanan**. What do they pay, do you know?

Mr. **Wheeler**. I haven't had access to their books to know what they do pay, but this information can be obtained from the Interstate Commerce Commission.

Mr. **Buchanan**. You don't know whether they get a reduction or not?

Mr. **Wheeler**. No. But I do know that one large packer has four leased wires between Chicago and New York alone, and has over 7,000 miles of leased wires, or nearly three times the mileage that is operated by the Federal bureau.

Mr. **Buchanan**. Perhaps since the packers' bill has been passed we can get that information. If they can give them reduced rates we should have them too.

Mr. **Wheeler**. I will ask Mr. Whalen if he recalls the extent of the five packers' leased wires.

Mr. **Whalen**. No, sir; but they have their leased wires from Chicago to the East and to all other market centers.

Mr. **Wheeler**. I think the greatest extent of any one of the large packers is approximately 7,500 miles. If you really want that information as to the packers, I think we can probably get it for you, and also as to the rate.

Mr. **Anderson**. I think we will be very glad to have that.

Mr. **Morrill**. We can, if you wish, insert some information as to the mileage and rates in the record, as far as we can get it.

My understanding of the statement of the American Telephone & Telegraph Co. was that there was no reduced rates on leased wire matters; that they had a demand for more than they could furnish, and that it was all at the same rate at the time ours went in.

Note.—The leased wire mileage operated by the five leading packing companies amounts to approximately 23,700 miles. The largest amount operated by any one of these companies is approximately 7,500 while smallest is over 2,700 miles.

The rates charged to private wire leasing organizations are the same as those charged to the Government, i. e., $24 per mile. These rates are supervised by the Interstate Commerce Commission.

Mr. **Wheeler**. As a matter of fact, if we wish to extend our leased wire, we have got to get in an application months before to get that extension, because of the wires not being available for the service.

Mr. **Anderson**. Is there anything further now on this item?

Mr. **Sherman**. In order that the record may not carry a misapprehension, I should state that as far as the fruit and vegetable market work is concerned we are still furnishing approximately the same service on the Pacific coast, in the way of temporary stations, especially in the principal producing areas, for short periods, which are served by commercial wires, and the producers in that neighborhood are served by mimeographed reports issued by the men temporarily stationed there. We have substations in the Imperial Valley and at Turlock for the cantaloupe growers, but we do maintain a mimeograph and news man on fruits and vegetables in Los Angeles all the time, who issues a report every day, but since we have no leased wire connection and have to pay the regular Government rate on the individual messages we only send him each day the eastern market reports on the two commodities which happen to be the ones in most active movement at the time. There are, as you know, a large number of those temporary market field stations conducted in connection with the fruits and vegetables in the news work, so that we keep eight men in a continual traveling status, operating those field stations in the heavy producing areas from time to time, and in that way carry some of the service beyond the territory immediately reached by the leased wire.

Mr. WHEELER. We also have a dairy and poultry products office in San Francisco which is still operated, which is not in touch with the leased wire.

Mr. TENNY. I think there should also enter into these reports this fact, that Mr. Wheeler has emphasized, but perhaps not sufficiently, that the States are becoming very much interested in the distribution of market news. We are having a very great demand in certain States, Iowa, for instance, right at the present time, and also Texas, for an extension of the leased wire, to quite an extent, if it can be worked out, even at the expense of the State. We are insisting that those extensions be brought under our control as a regular part of our wire. There is a question up now as to whether we are going to have statutory positions enough or telegraph operators to operate two or three drops that may come up in the very near future, and if there is to be any material extension of the leased wire under any condition, it is very essential that we have a few more statutory positions so that we can control what goes on the wire, whether this comes up in what might be termed State offices or not.

Mr. ANDERSON. The next item is page 232, evidently an item affecting the consolidation of the Bureau of Markets and Crop Estimates with the Office of Farm Management and Farm Economics, under the name of "Bureau of Agricultural Economics." Do you want to discuss that, Dr. Ball, or will Mr. Morrill discuss that?

Mr. MORRILL. Do you think it necessary to discuss it? It is the same item extended in language so as to apply to the redesignation of the bureau that we had a year ago when the Bureau of Markets and Crop Estimates were consolidated. The purpose is precisely the same that it was then. If you approve the consolidation of the existing Bureau of Markets and Crop Estimates and the Office of Farm Management, then this item should be approved also, for the same reason that it was approved a year ago.

Mr. ANDERSON. Very well. We will adjourn now until 2 o'clock this afternoon.

FOR ENFORCEMENT OF UNITED STATES COTTON FUTURES ACT.

Mr. ANDERSON. We will take up the item on page 233, transfers to the statutory roll from the lump sum for the enforcement of the United States cotton futures act; an apparent increase of $7,709, but an actual increase of $16,196.

Can you give us a list of the persons transferred from this item and the items to which they are transferred?

Mr. MORRILL. I do not have that list, but Miss Clark can furnish it. She has all the statutory increases.

PREPARATION AND DISTRIBUTION OF COPIES OF PRACTICAL FORMS OF THE OFFICIAL COTTON STANDARDS.

The work under the cotton futures act consists in the preparation and distribution of copies of the practical forms of the official cotton standards of the United States, checking up on the quotations of the various spot markets which are used for the purpose of arriving at differences in value in connection with the settlement of future contracts, where cotton is delivered on such contracts; and in connection with the maintenance of the price quotation service for cotton throughout the cotton belt.

In connection with the preparation and distribution of the practical forms of the standards arises what we consider to be the necessity for an increase in this item over last year.

The American-Egyptian standards, as you were told the other day, have arrived at the point where it seems necessary to revise them, on account of the change in the character of the crop from what it was at the time those standards were prepared, and if that change in those standards is made, as I think it should be, it will be necessary to replace very largely the sets of standards that are now in the possession of various people in the cotton industry.

There are five boxes, as we call them, of those American-Egyptian standards, and they are sold for $5 apiece, making $25 for the set of the American-Egyptian standards. The cotton used in those standards is very much more expensive than the cotton used in any of the other standards, notwithstanding the great drop in prices generally, and to make the revision which will represent the present character of the crop will cost a good deal in the way of the purchase of cotton.

Now, the tinged and stained grades of the standards for upland cotton, as we call it—there are 11 boxes, and for some time back there has been a feeling and a criticism among the members of the cotton trade that those tinged and stained standards no longer truly represent the character of the cotton which falls in that general class, and that those standards should be revised. In fact, the departure of the crop from what it was when those standards were prepared has become so noticeable that the standards are becoming less and less useful. They represent more a basis for quotations than they do a standard.

Of course they must be adhered to on the cotton exchanges, in connection with the delivery of cotton, until the Secretary officially changes them. In a short time, however, we must proceed with a revision of the standards, and work has been done in that direction already, which will have to be followed up by consultation with the representatives of the various interests in the cotton industry for the purpose of seeing whether the standards in their revised form will be satisfactory.

That means that immediately upon any change being decided upon, the work of preparing and distributing the practical forms will begin, very much in advance of the effective date, which could only be a year after notice being given. As there are 11 boxes of those standards and 12 types in each box—although not every type would be changed—there would be a considerable number of changes.

Mr. ANDERSON. What are the changes in the crop which necessitate a change of standard?

Mr. MORRILL. At the present time our standards are entirely too deep in color to represent the bulk of the commercial movement of tinged and stained cotton. In other words, the standards must be lightened up. The use that is made of standards in the cotton trade is different from the use of standards made in the grain trade. They proceed upon two entirely different theories. In the cotton trade the standards are made by the use of samples of cotton representing the basic idea, whereas in the grain trade we use printed specifications plus a certain amount of educational work and training as to certain factors that require the use of judgment. Consequently in the cotton trade the standards are not very useful unless they do represent the bulk of the cotton that is handled, because there is no means of comparing the actual cotton with something that does not exist to any great extent.

Mr. BUCHANAN. What year were those standards made?

Mr. MORRILL. The standards for white cotton were established in the fall of 1914. I think in December, 1914, and they have continued unchanged from that time to this. They were reestablished in August, 1916, when the cotton futures act was reenaeted, but there was no change in them at that time; simply a reenactment of existing standards for white cotton.

Mr. BUCHANAN. Where has the cotton changed?

Mr. MORRILL. I was not speaking about the white standards when I said there had been a general change in the character of cotton. I am speaking about the tinged and stained standards.

Mr. BUCHANAN. That would necessarily mean a changing standard. If you base your standard on the tinge and stain, that all depends on the season, each year.

Mr. MORRILL. No. I would not want to leave you under that impression. It is not the idea that the standard should be changed simply because of a variation between this year's crop and last year's crop, but the fact is that watching the crop over two or three years has shown that the standards are not applicable to the general run of cotton. Now, that is not absolutely and entirely due to the change in the crop. The standards when they were first established, notwithstanding the fact that they were agreed upon by the representatives of the cotton industry, were a compromise and were not entirely satisfactory in the beginning.

Mr. WASON. Not satisfactory to whom?

Mr. MORRILL. Not satisfactory either to the cotton industry or to ourselves, like all compromises.

Mr. WASON. Do you mean the grower of cotton or the user of cotton?

Mr. MORRILL. I am speaking of both. In other words, the criticism is general. It is a criticism that is meritorious.

Mr. WASON. Why were those standards fixed at that time, then, by your bureau, if it was not satisfactory to the cotton grower or the consumer?

Mr. MORRILL. They were fixed because they were the best we could get at the time. They were the nearest approach to what would be satisfactory that we could get at the time. It was necessary to have the standards in order to carry out the provisions of the cotton futures act, which provided for the delivery of that kind of cotton on contract, and we had to have some standards, and we did the best we could at the time, hoping that as time went on we could get the basis for improving them and make them what they ought to be, and we think we are about in a position to do that now.

Mr. BUCHANAN. These standards represent grades, do they not?

Mr. MORRILL. They represent grades; yes. I am not speaking about the length of staple standards, because they are on an entirely different basis.

Mr. **Wason**. Then I understand from your answer that at the time these standards were established you could not find in the cotton-growing sections of the country any sample cotton that would measure up to what you attempted to fix as the standard of a particular grade?

Mr. **Morrill**. No. We have plenty of cotton that would grade according to these standards and match up. In fact, we buy actual bales of cotton to make the standards, but the standards being a compromise were not as fully representative of all of the cotton grown, of the tinge and stain character, as we would like to have them; and gradually through a series of years the departure has become greater because of the gradual change in the color of the bulk of the cotton. The cotton has lightened up.

Mr. **Anderson**. What is it that colors the cotton?

Mr. **Morrill**. It comes about through frost and the action of the weather and the elements.

Mr. **Buchanan**. Too much rain colors it; frost colors it if it is a late crop; if the cotton opens late, the frost colors it; too much foliage colors it also.

Mr. **Anderson**. You do not conduct any extension service under this?

Mr. **Morrill**. No. Under this appropriation that you have here, there is no extension service of the kind that we have for food products or fruits and vegetables, but we have this sort of an extension, which is one of the reasons why there should be an increase in this appropriation: After these copies of the practical forms of the official standards are sent out and distributed among the trade—we have from fourteen to fifteen hundred sets out now—it is necessary to reexamine them from time to time to see whether the color has faded out or trash has been shaken out, or they have been otherwise handled so as to depart from the original standard, and wherever we find, upon that inspection, that there has been a departure we cancel the photograph of the box. There is a photographic representation of all the cotton in the box carried in the lid of each box, and if more than 5 samples out of the 12 in the box no longer represent the true standard, then we cancel the whole thing. Now that makes that box no longer usable in the cotton trade, and its use naturally will be discontinued with that cancellation of the photograph, or they will send it in for replacement, for which we make a charge. There is no charge for the extension itself. We do that as a protection to the industry as a whole, so that unrepresentative standards will not remain out.

Mr. **Anderson**. What I want to get at is, that there is no Government service that corresponds, for instance, to the supervisory inspection of grain?

Mr. **Morrill**. No. We do have a classification of cotton for delivery on future contracts, which is paid for out of funds created by the seventh subdivision of section 5 of the Cotton Futures Act, but not paid for out of any of this money.

Mr. **Anderson**. That is the appeal proposition?

Mr. **Morrill**. No. It was formerly the appeal proposition. Up until March, 1919, the classification committees employed by the exchanges classified all the cotton delivered on contracts, subject to an appeal to the Secretary of Agriculture at Washington. That condition became unsatisfactory, and in March, 1919, the cotton futures act was amended so that the employees of the Secretary of Agriculture would classify that cotton in the first instance, entirely eliminating the appeal.

Mr. **Anderson**. That is not covered under this item?

Mr. **Morrill**. That is not included in this item in any way. That is an entirely self-sustaining activity.

Mr. **Buchanan**. That is only the classification of cotton in contested settlement cases?

Mr. **Morrill**. Every single bale of cotton that is delivered on a future contract by either New York or New Orleans is classified by a Government employee, who is a member of the Board of Cotton Examiners at New York or at New Orleans, as the case may be. Upon that classification a certificate is issued, which serves for the purpose of the delivery on the contract. That determines the grade and the length of staple, and upon the basis of that certificate determination is made as to the differences in prices that should govern in the settlement of the contract.

Mr. **Anderson**. Is all of this money then spent on the making of the standards and the keeping of them up to date?

Mr. **Morrill**. And on the quotation service.

Mr. **Anderson**. And on the quotation service?

Mr. **Morrill**. Yes sir.

Mr. **Anderson**. About how does that divide up?

Mr. **Morrill**. That divides up in this way, that there is I think, $51,000—I don't know that I have the exact figures here, but approximately $51,000, spent on the quotation service. I do not seem to have the exact figures, but of the remainder—the difference between $51,000 and $146,000, all but about seven or eight thousand dollars would go for the preparation and distribution of the copies of the standards, and that seven or eight thousand dollars would be for general administrative expenses, in connection with the enforcement of the Cotton Futures Act.

I started to say, in regard to the extension of these practical forms, that by reason of the demands on the time of our men connected with the preparation and distribution of the standards, and the quotation service we have not been able to keep inspectors on the roads sufficiently continuously to check up on all of these outstanding boxes of practical forms, and from time to time we find that boxes here and there have gotten radically out of line and ought to be canceled, and we do, as soon as we learn that they are that way; but we are behind instead of ahead of the game in keeping up with that.

Mr. **Buchanan**. These 1,500 standards that you have out, are they distributed practically to the cotton factors, buyers, and exchanges, and what not?

Mr. **Morrill**. Primarily among cotton factors, dealers, merchants generally; every exchange has a set or sometimes two or three; most all if not all of the agricultural colleges have sets. All of these cooperative grading and demonstration associations of farmers have sets, and then there are some miscellaneous.

Mr. **Lee**. Do the cotton factories have them?

Mr. **Morrill**. Oh, yes; all of them. A good many of the mills have sets of them. A great many of them have been sent abroad to various organizations that are interested in our cotton. When we first started out we placed copies of the standards with the cotton exchanges that are used in arriving at the differences, and we placed copies with a great many agricultural colleges free as a demonstration, under the separate investigation and demonstration item. We discontinued that, and we now require that the agricultural colleges and exchanges pay for their sets just like anybody else. In other words, we do not look upon that as demonstration any more. The present price of copies of the standards is just double what it was when we first started out under the Cotton Futures Act. In other words, at that time the price was $2.50 a box. Now it is $5 a box.

Mr. ANDERSON. Will that price continue, irrespective of the price of cotton?

Mr. MORRILL. I think that as long as the traffic will bear it, we will continue that price, because $2.50 does not represent the cost of the service. Five dollars does not either. We think that $5 a box or $45 for the set of nine white grades is about all that the traffic will bear, but even at that it costs more, and we have looked upon that as a charge against the education of the country as a whole.

RECEIPTS.

Mr. ANDERSON. What are the receipts under this item?

Mr. MORRILL. They run from $30,000 to $35,000 a year from the sale both of the copies of the standards and of the loose and rejected cotton that we have to dispose of.

Mr. ANDERSON. Those sums are not turned into the Treasury?

Mr. MORRILL. Yes. That sum of thirty or thirty-five thousand dollars a year goes straight into the Treasury as miscellaneous receipts, with the exception that during this past year, under this proviso, the cotton that we rejected and sold was credited back to the appropriation.

Mr. ANDERSON. And how much did that amount to?

Mr. MORRILL. I think this is the first year we have had that, and it only covers six months. I haven't the amount that has been credited back this year. That does not, however, cover the receipts from the sale of the practical forms themselves—the $5 a box that I am talking about. That only covers the loose and rejected cotton that is left over after making the samples.

TINGED AND STAINED COTTON.

Mr. ANDERSON. In this tinged and stained cotton, does it run pretty uniform in a bale? I mean is the entire bale usually stained or tinged?

Mr. MORRILL. Yes. It will be generally of the same character throughout, but varies in details. In other words, a bale will not run strictly uniform. We have that trouble in the preparation of our standards. We will start in on a bale which at first is entirely all right, but it will run out before we get through. Sometimes we can only use half of a bale, and that means that we have to replace that bale with another, which meets our requirements. That is how this sale of rejected cotton comes about. Of course, the cotton trade has the same experience, too. In other words, these standards are not artificial. They represent the actual cotton bought in actual sales, and that work is done here in Washington.

COTTON CLASSIFIED FOR DELIVERY ON CONTRACT.

Mr. **Lee**. Can you tell me how many bales of cotton were delivered on contract at New York and New Orleans?

Mr. **Morrill**. I haven't the number delivered on contract, but I do have the number that we have classified for delivery on contract. The deliveries on contract would be somewhat larger than the number of bales that we classify, for the reason that the same cotton may be retendered from time to time before it goes out of the market. It all goes out of the market eventually, but there may be several turnovers sometimes.

Mr. **Lee**. You have got no estimate, then?

Mr. **Morrill**. No, not of the the actual deliveries. However, we could get up those figures from the New York and New Orleans cotton exchanges that are turned in to the Government and give you the exact deliveries.

Mr. **Lee**. Just put it in there.

Number of bales of cotton delivered on contract on New York Cotton Exchange during season 1920–21 (year ended July 31, 1921)	267,700
Number of bales of cotton delivered on contract on New York Cotton Exchange during six months ended Jan. 31, 1922	144,900
Number of bales delivered on contract on New Orleans Cotton Exchange during season 1920–21 (year ended July 31, 1921)	108,500
Number of bales of cotton delivered on contract on New Orleans Cotton Exchange during six months ended Jan. 31, 1922	76,000

Mr. **Morrill**. As to the cotton that we have classified for delivery on contract, in the period since March 4, 1919, we have classified a total of approximately 500,000 bales, at both New York and New Orleans. That is a period of not quite three years. I have the figures month by month of the amount of cotton that we have classified. For example, in January, 1922, this year, we classified in both New York and New Orleans 6,565 bales. I have that month by month back to March, 1919.

Mr. **Anderson**. There must be a great many more transactions than that delivery would indicate.

Mr. **Morrill**. Oh, yes. The total number of bales sold on the New York and New Orleans cotton exchanges in a year will run over one hundred million.

Mr. **Buchanan**. Oh, that is straw sales. That is not actual cotton.

Mr. **Morrill**. Well, I am speaking, of course, from the standpoint of sales, without regard to whether the cotton is delivered or not. The sales aggregate over a hundred million bales a year on the two exchanges. The deliveries are relatively very small.

Mr. **Anderson**. Are those contracts settled by a statement of differences?

Mr. **Morrill**. Depending on what you mean by a statement of differences. They are settled by a set-off or ring-out, as they call it, through the clearing house. That is to say, whenever a particular member of the exchange has both bought and sold for the same month's delivery, the two are offset against each other, and that of course means that there is no delivery made as to those contracts which are offset against each other. But any buyer who has bought the cotton, but who wished to receive delivery, can do so simply by holding his contract.

Mr. **Anderson**. How many grades are delivered on contract?

Mr. **Morrill**. There are now deliverable 10 grades—7 white and 3 tinges and stains. At first there were 20 grades deliverable. All of the grades of the official cotton standards of the United States were deliverable. In March, 1919, that number was cut down to 10. The lowest grade deliverable now is "low middling."

Mr. **Anderson**. What was the effect of reducing the number of grades deliverable on contract?

Mr. **Morrill**. If I might answer your question a little differently, the effect of raising the lowest grade deliverable from "good ordinary" to "low middling" was to improve the contract. It made it a decidedly better contract and made it reflect the relation that it ought to have toward spot cotton, in the way that the cotton futures act was originally intended that it should. When the cotton futures act was passed and up until the period during the war the contract sold uniformly slightly above spots in the South. When the war came on the lower grades, "good ordinary" and "strict good ordinary," and some of the tinges and stains became relatively unmarketable. In other words, there was a lack of demand, largely due to the fact that certain of our foreign markets were cut off, Germany in particular, and in addition the War Department, through the medium of its contracts and inspection requirements, forced the mills to use a higher grade cotton on their contracts with the War Department, making the lower grades "good ordinary" and "strict good ordinary" practically unmarketable, as I said. That condition has not ceased, notwithstanding the discontinuance of the war.

In other words, the mills have not back to using good ordinary and strict good ordinary in as great proportion as they did before the war. It is easier, from the mills standpoint, to use the higher grades of cotton with respect to the comfort of its operators, the amount of waste, and things of that kind; it is a little difficult to get out of that sort of a habit, once established. They are gradually getting out of it. In fact, it gets back to an economic proposition anyway, that whenever these very low grades go low enough to make it worth while, they will go back to using those low grades. There is a tendency in that direction already.

Mr. **Anderson**. Where deliveries are made on these contracts, is the delivery always made on the basis of the lowest grade that is deliverable under the contract?

Mr. **Morrill**. Not always, but you can take it as a general proposition, that the delivery which is most disadvantageous to the buyer or the most advantageous to the seller, is the one which will be made. It is a general principle. Of course, that is subject to exceptions, like all other things. They might not have the cotton of the most undesirable grade to deliver, and in fact, during the recent months, low middling has not constituted the bulk of deliveries.

Mr. **Lee**. In other words, they tender them something that they will not take?

Mr. **Morrill**. Well, they take it. They have got to take it when it is tendered to them.

Mr. **Lee**. Well, they can supply it without taking it.

Mr. **Morrill**. Well, it is regarded as a breach of contract not to take it. They have to sell a contract out if they do not wish to take it. There is only one way a man can escape receiving delivery on a contract without having to pay a penalty, and that is by selling out before the delivery time comes about, so that he can off-set his sale against his purchase.

Mr. **Buchanan.** Certainly; forcing him to sell out, in other words.

Mr. **Morrill.** Yes. Now, as a matter of fact, the present condition is that the future contract is selling right along on a parity with spot quotations. You can see from this chart that I have here, which appears in the publication called "Weather, Crops and Markets," of January 14, on page 39, the upper line is practically continuous throughout as being the New York quotations. The short dots are the spot quotations in the South, and the long dashes are the New Orleans quotations. Below that chart you will find line for line the daily spot prices, which have traveled along in just about the same relation as the New York and New Orleans future quotations.

This condition, if I might digress, is a condition that does not exist on the grain exchange where uniformly, ever since the armistice, the future trading of the grain exchanges—the quotations for the contracts on the Chicago Board of Trade have been at a considerable discount under the cash grain prices. I have a personal opinion about what will be found to be the reason of that. I think it has a good deal to do with the terms of the contract. Or, to put it differently, the terms of the contract underlie in a large measure the discount that occurs on the Chicago Board of Trade futures under spots or cash grain prices.

Mr. **Buchanan.** Does the department have anything to do with the form of contracts?

Mr. **Morrill.** We do not have anything at all to do with the question of margins on contracts. Under the cotton futures act our duties are simply to maintain a quotation service and see that the various spot exchanges quote spot cotton correctly, and to prepare and distribute copies of the standards. The Treasury Department has placed upon it the duty of getting reports as to the volume of transactions on the New York and New Orleans future exchanges, and the methods by which those transactions are settled, and the deliveries on contract; but neither the Treasury Department nor the Department of Agriculture has any control over speculation as such on the cotton exchanges.

The situation is a little different on the future deliveries on contracts, which I will discuss when your committee comes to a consideration of that act.

There have been a number of propositions before committees in Congress to amend the cotton futures act, which I understand are already being discussed by Chairman Haugen's committee. I do not know that I should undertake before this committee to go into the details of these propositions, unless you want me to, as they involve an amendment rather than a question of appropriation. If some of those amendments are made—in fact, I think if any of those amendments are made, they will enlarge the amount of work that the Department of Agriculture has to do in connection with the enforcements of the cotton futures act and possibly will increase its expenses temporarily.

Mr. **Anderson.** Is there anything further on this item?

QUOTATION SERVICE.

Mr. **Morrill.** Do you want me to say anything further about the quotation service? That is to be maintained on precisely the same basis during the coming year that it has been during this year, except that we are constantly endeavoring to make the bulletins more comprehensive and the distribution more effective, but without any increase in the expenditure for doing that. The bulletins that we are now getting out are sent out from six points, Charlotte, Atlanta, New Orleans, Dallas, Memphis, Oklahoma City. They go out once a week, and they cover quotations day by day on the future months on the New Orleans and New York cotton exchanges.

The middling spot quotations day by day in the markets in the section of the country in which the bulletin is distributed are more interesting. They show the established quotations on and off, for the various grades of the official cotton standards. In addition, they show the prices on actual sales at interior points, of all grades of which we can get reports for the preceding week. In addition to that, they include quotations for cotton seed at various points; also a small amount of information as to the general condition of the market, and in some of the bulletins we are including the freight rates from the markets for which we have quotations to other important markets. For example, we have a quotation in the Charlotte Bulletin for cotton sold at a number of points in North Carolina and a number of points in South Carolina. We take Charlotte for example, for which we show a quotation for middling cotton of 16.30 cents, and we find in the same bulletin that the freight rate from Charlotte to Norfolk, Va., is 66½ cents per 100 pounds. Now, that informatian is included also for Savannah, Wilmington and Charleston.

Mr. **Anderson.** The freight rate is not a very large factor in the case of cotton, is it?

Mr. **Morrill.** Compared with the total price of the cotton it is not a very large factor, but in arriving at the market to which you will ship, it is a competitive factor, depending upon the quotations in the different markets, and whether they are in line with each other. Sometimes a shipment that would seem undesirable becomes commercially desirable because of the fluctuation in prices. We not only include those particular quotations that I have named, but also the freight rates to consuming points, such as Boston and to Carolina Group A and Group B mills. So that as far as possible a man who receives this bulletin may have information that will give him a fairly accurate idea of market conditions that he will have to meet.

Mr. **Buchanan.** Do you include the price of the cotton at the consuming point? The quotation at the consuming point, in that bulletin?

Mr. **Morrill.** No, only occasionally do we include the price at the strictly consuming point, except in the case of the Carolinas. The reason is that we haven't got money enough to put men in the New England points. for example, to get the quotations ourselves, and we do not feel that we can rely sufficiently on their quotations, or quotations from unofficial reports to quote them as our own. In other words, we do sometimes include in our bulletin quotations that are furnished to us from commercial sources, but when we do that we say so.

Mr. BUCHANAN. Has it been your experience that you found those commercial quotations incorrect or not?

Mr. MORRILL. Not deliberately incorrect, but there is a factor of judgment of the person who makes the quotation, as to the classification of the cotton. The quotation itself might be a correct statement of the price paid, but the classification that he reports might not be correct.

There are so many conditions in classification.

Mr. BUCHANAN. Have you found any amount of mistakes along that line?

Mr. MORRILL. I would not call it mistakes.

Mr. BUCHANAN. Deliberate lies, then?

Mr. MORRILL. We find that some mill buyers have a different idea of what is inch and one-eighth cotton from what the official cotton standards of the United States call for. In other works, they may call inch and three-sixteenths cotton—what is actually inch and three-sixteenths cotton, they might call it inch and one eighth. In other sections they might have a different idea. It is the difficulty of knowing exactly what it is that we mean as a mental conception that makes us a little afraid to use the commercial quotations without showing that they are strictly speaking commercial quotations.

Mr. BUCHANAN. Now, concisely, what other advantage has your quotations over the commercial market quotations?

Mr. MORRILL. They have this advantage. In the first place, as quotations there has been nothing published of this character, with reference to interior markets, in a comprehensive form. You may find in a Charlotte newspaper a broad quotation for cotton in Charlotte.

Mr. BUCHANAN. Now, on that point, the difference in the market at the interior point is simply the added freight rate from that interior point to the central point?

Mr. MORRILL. That perhaps might seem to be what it ought to be, but it is not. We have found by experience—anyone can take these quotation service bulletins, and see that there are differences in price, that can not be accounted for by differences in transportation costs. Sometimes there is a real genuine explanation. Sometimes it is simply because of the fact that the buyer has been able to go to one point and get cotton cheaper than at another point. That has been called to our attention, and to a large extent that is one of the advantages that farmers see in our bulletin. That is, that they are not dependent entirely on what the buyer tells them.

In connection with this bulletin, we make every effort to place it where the farmers themselves will get it. There are about 16,000 gins in actual operation throughout the cotton belt; something over 5,500 of those gins are taking this bulletin, under a promise to us to post the bulletin where the farmers who come to the gins can see it.

In addition to that, we furnish it to any individual farmer or banker or merchant or anyone else who will ask for it and show that he has a reason for having it. Then we furnish it also to newspapers, wherever they will agree to use the material contained therein. We have some assistance from the State authorities in that direction. The Georgia Bureau of Markets takes our quotation service bulletin issued at Atlanta and copies verbatim all the quotations that come from Georgia points. They have a circulation of something like

25,000 among the Georgia farmers. We do not attempt to duplicate that service. We simply turn the information over to the State authorities.

Mr. Buchanan. This is all sort of like locking the stable door after the horse is stolen. Your bulletin is issued weekly or semiweekly and it takes it a day or two to get there, and by the time the farmer gets it the cotton market has changed a cent a pound, has it not?

Mr. Morrill. The cotton market might change but when the farmer or merchant receives this bulletin week by week and watches the trend of prices throughout that week, and then some one comes along and offers a different price or asks a different price, there is a natural ground upon which the seller can ask for an explanation of what caused the decrease.

Mr. Buchanan. Yes, he could see that cotton last week was so much a pound and why isn't it that much now? He could do that, and the fellow would perhaps say "Cotton has gone down."

Mr. Morrill. Of course, there is no way that we can anticipate the movement of prices. We can only state what is actually happening.

Mr. Anderson. Do you have a daily quotation service that goes to the newspapers?

Mr. Morrill. No; not on cotton. The newspapers of course publish quotations from day to day of their own markets, but they get that direct. We do not attempt to put out a bulletin every day, we could not do it without very great increase in expense to the service, with the exception of individual markets.

Mr. Anderson. Any other questions on this item? Is there anything further that you have to say, Mr. Morrill?

Mr. Morrill. The only thing that I would say in addition is that I have spoken very frankly about the official cotton standards, because we feel in the case of the standards, like all other standards, that once established they can not be expected by anyone to be final. Nothing is perfect, and we have done the best we could in establishing the standards, but the time has come when it is necessary to consider their revision. It is not a seasonal matter, but it is a permanent matter.

TRANSFER OF EMPLOYEES TO STATUTORY ROLL.

In connection with the transfers to the statutory roll from the lump sum, for the enforcement of the United States cotton futures act, we propose transferring one clerk, class 3, $1,600; two clerks, class two, $2,800; one skilled laborer, $1,000; one laborer, $900; three laborers, at $720 each, or $2,160, making a total of $8,460.

Mr. Anderson. All right. Now what is next?

FOR ENFORCEMENT OF UNITED STATES GRAIN STANDARDS ACT.

Mr. Morrill. The next is the enforcement of the United States grain standards act.

Mr. Anderson. Page 235.

Mr. Morrill. In connection with the appropriation for the enforcement of the United States grain standards act, there is an apparent increase in the lump sum from $538,623 for 1922 to $557,600 for the coming fiscal year. We had available at the beginning of this fiscal year about $30,000 from the original continuing appropriation. That lump sum of $30,000 will be, we expect, entirely wiped out this year, and, adding that to the appropriation for this year, leaves us for the coming year, if the full amount of the estimate is granted, with an actual decrease of approximately $11,000 from the amount available for the current fiscal year.

Mr. ANDERSON. How much did you spend of the old sum this last year? Do you expect to spend all of it?

Mr. MORRILL. We expect to wipe it out this year.

Mr. ANDERSON. Has something been spent under that item every year?

Mr. MORRILL. Yes; something has been spent under that item every year. It has been gradually reduced every year, and we expect to wipe it out entirely this year, so that for next year we expect to be on a basis solely of the amount of this item, if it is granted. A statement will be inserted showing the amount expended each year from the original appropriation.

Statement showing expenditures, by fiscal years, from the original appropriation, for the enforcement of the United States grain standards act.

1917	$148,790.56
1918	30,021.52
1919	19,203.79
1920	14,989.96
1921	3,061.23
1922	$19,643.64
Balance Feb. 15, 1922	[1] 14,289.30
Total	250,000.00

Up to this time, under the grain standards act, we have put into effect the standards for corn, wheat and oats in the order in which I have stated them. We have not put into effect the standards for any other grains. We might be able to put into effect standards for grain sorghums, rye, and milled rice, if the appropriation permitted. We are working on barley, flax, rough rice and brown rice under the investional item carried under marketing and distributing item that Mr. Tenny spoke about. We do not expect, however, to put into effect any of the additional standards, because the money that we estimate as necessary for the enforcement of the grain standards act for next year will not be sufficient.

In carrying on the work of enforcement of the grain standards act, we have officers at about thirty seven markets throughout the United States. We have some 160 inspection points that have been designated under the grain standards act for the purpose of that law. That compares with 66 inspection points that we had in 1916, when we first started enforcing the law.

APPEALS FROM GRADES OF GRAIN BY LICENSED INSPECTORS.

One of the largest features of the supervision work is the handling of appeals from the grades placed upon the grain by licensed inspectors. Those appeals, of course, are limited to shipments in interstate commerce, but in order to show the growth of that work, I might say that in 1917 we handled 324 appeals. In 1918 we handled 1,388 appeals. In 1919 we handled 6,651 appeals. In 1920 we handled 10,960. In 1921 we handled 11,617. In the six months of this fiscal year we have handled over 10,000 appeals, or almost as much as we did in the entire preceding fiscal year.

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[1] This balance will be completely used up during the current year.

Mr. **Anderson**. A cent a bushel means more than it used to.

Mr. **Morrill**. Well, it has another meaning. It means that the grain trade is more insistent upon finality in respect to the certificates of the grade of grain than they were before. In other words, under the system which the grain standards act provides, which is of supervision instead of Federal inspection, all grain is inspected in the first instance by a licensed inspector who is not an employee of the Department of Agriculture, and there is an appeal from him to the Secretary of Agriculture, and the certificate issued under the law by the Secretary of Agriculture becomes practically final. Now, it might seem at first glance that an increase in the number of appeals might be a reflection on the grain inspectors, or a reflection on the grades themselves. The fact is, as a matter of fact, as shown by our receipts from appeals, that inspectors are not any more inaccurate than they were before. Rather perhaps they are getting more accurate, but the grain trade wants something that can be shown to a buyer as final, as to the grade of the grain.

Mr. **Anderson**. To what extent do these appeals represent shipments for export?

Mr. **Morrill**. I do not have the figures as to the number of appeals on experts. It can be gotten all right. It would require the tabulation of the various port markets, in order to make up those figures.

Mr. **Anderson**. Have you any figures there to show the number of appeals sustained, in which complaint was raised, and the number of appeals which were not sustained?

Mr. **Morrill**. No. I do not have those figures here, but I can give you those. I might say in this connection that the general headquarters are located at Chicago and the board of review is located there, and all questions of inspection and official appeals are handled at Chicago, so that the records are there. They are always available, and we can get any information that you want, but I haven't brought that information here today. I can say this, though, that as to the receipts from appeals in 1917 we received $543. In 1921 we received $26,536.

APPEAL FEE.

Mr. **Anderson**. What is the fee on appeal?

Mr. **Morrill**. The fee I think now is $2 a car. It was $3 a car.

Mr. **Anderson**. The State fee is a dollar, isn't it?

Mr. **Morrill**. The State fee in Minnesota is a dollar, but that is in addition to the inspection fee of the same department. In our case the fee is collectible only in case the inspector is sustained. If he is not sustained, the fee is returned.

Mr. **Anderson**. I do not see the philosophy of that.

Mr. **Morrill**. Well, I never have seen it either. I know the reason that is given all right; but when the Grain Standards Act was pending, we asked the Committee on Agriculture to amend the pending bill so as to make the fee collectible in all cases, but the argument presented against that was that it was not the fault of the appellant if the inspector was correct or not correct, as the case might be, and that therefore if the appeal was sustained he ought to get his money back.

Mr. **Anderson.** But the appeal might be either way or both ways. A buyer might appeal on the theory that he is going to get a grade lower, and the farmer or shipper might appeal on the theory that he is going to get it raised. The inspector could not be right both ways.

Mr. **Morrill.** No, sir, he could not be. He is either right or wrong, one or the other.

Mr. **Buchanan.** But I understand you to say that there are lots of those appeals now simply for the purpose of getting a final certificate.

Mr. **Morrill.** That is quite true. That is true in a great many cases, and then the question of blame or not to blame of the first inspector does not figure in it at all, because they are after the final certificate and the final authority, That is what they are after in a great many cases.

Mr. **Anderson.** Isn't it final anyway, if they do not appeal?

Mr. **Morrill.** It is final if they do not appeal, and it is final if they do appeal, but it does not have the authority. That is the finality that I am speaking of.

Mr. **Buchanan.** It is not as good, as a commercial proposition, to sell his grain.

Mr. **Anderson.** I can see where that would cut some figure on the export shipments, but I do not see where it cuts much figure in domestic shipments.

Mr. **Morrill.** A great many contracts are now made specifically calling for Federal appeal.

Mr. **Anderson.** I can not see how there can be any such thing as a final inspection report anyway, because here is a carload of grain comes into Minneapolis; it runs into a bin; it might be run out again immediately and another inspector and another certificate made. It might be shipped to Buffalo and there it would have another inspection and another certificate.

Mr. **Morrill.** But each transaction is made, each purchase or sale that is made is based upon the grade of the grain at a certain point. Whether it passes through another transaction at a subsequent point has nothing to do with the settlement of that contract.

Mr. **Anderson.** Let me ask you, in the States where they have appeal systems within the State, does an appeal lie from the determination of the appeal board or does it lie direct from the inspector?

Mr. **Morrill.** It can be taken either from the appeal board or direct from the inspector, according to what the owner of the grain wants to do. They are both licensed inspectors. Take the Minnesota appeal board, the members of that board are licensed under the United States Grain Standards Act. So are the inspectors in the inspection department, who are below that appeal board. Now, if you are an owner of grain, and your shipment is in interstate commerce, you can appeal direct from the first inspector, or you can appeal from the board of inspection.

Mr. **Anderson.** Is that appealed to the local supervisor, or is it appealed to the appeal board in Chicago?

Mr. **Morrill.** That is to the local supervisor. There is a provision for a board of review at Chicago if the parties demand it.

Mr. **Anderson.** But this final certificate that you are talking about is exclusively issued by the Federal supervisor?

Mr. **Morrill.** That is exclusively issued by the Federal supervisor. It is called a Federal appeal grade certificate. It is final so far as we are concerned, with that one exception, that the findings of the board of review at Chicago may be obtained.

Now, without regard to whether the parties themselves appeal from our supervisor or want the board to pass on it, our board does pass on every case that the supervisor passed on, because he sends one half of his sample to Chicago to the board to review. We do that to keep our supervisors lined up all the time, to be sure that they are uniform in their interpretation of the standards, and as a protection against erroneous action later.

Mr. **Anderson**. That would not have any effect, however, on a certificate already issued.

Mr. **Morrill**. Not a bit. The only time that a certificate already issued is changed is when the owner of the grain himself applies for review.

Mr. **Anderson**. Of course, in ninety-nine cases out of a hundred that is impractical.

Mr. **Morrill**. It does happen sometimes, where there is a contest pending.

NUMBER OF INSPECTORS.

Mr. **Anderson**. You said you had 160 inspectors?

Mr. **Morrill**. One hundred and sixty inspection points.

Mr. **Anderson**. How many inspectors have you?

Mr. **Morrill**. Something over 400; about 400 licensed inspectors at these 160 inspection points.

Mr. **Anderson**. Are those State inspectors?

Mr. **Morrill**. Those include the State inspectors and the commercial inspectors both.

Mr. **Anderson**. What I want to get at is how many people have you got on your own rolls? You call them supervisors, I guess.

Mr. **Morrill**. We call them supervisors. This year we have got 67 grain supervisors; 25 assistant grain supervisors; 17 assistant surveyors, and 85 grain samplers. Then we have clerical and other forces incidental to the work, both in the field and in Washington.

Mr. **Anderson**. It seems to me you have got an oversupply of samplers.

Mr. **Morrill**. The sampling work takes a lot of time. It is slow work to get out around these various yards, some of them are miles apart, to find the particular car upon which the appeal is made and draw the sample and bring it in. Where you are not engaged in regular inspection you do not have the opportunity which the regular inspectors have of taking your cars as you come to them, but you have to go and find them. It takes lots of samplers to do that. Particularly, take a market like Chicago, where the yards are scattered miles and miles apart, it takes a lot of time.

Mr. **Anderson**. But you say last year you had a bunch of super-supervisors supervising the supervisors.

Mr. **Morrill**. You are thinking about the board of review at Chicago and the division supervisors. In other words, we have the United States divided up into six divisions, and these divisions are subdivided into districts, and the supervisors in these districts are under the general supervision of the division supervisors, and that division supervisor is used as a means of bringing about uniform action among the supervisors in handling any special complaints that need attention—general questions of administration that no one supervisor can deal with alone.

Mr. ANDERSON. But you have only one board of appeal, and that is at Chicago.

Mr. MORRILL. Well, I should not say we have only one. We have constituted also a board at Portland, Oreg., to handle Pacific coast cases, but the one at Chicago is the principal one and covers most of the United States.

Mr. ANDERSON. I wonder if you can furnish us with a statement showing the amount which has been spent under this item each year out of the original appropriation.

Mr. MORRILL. Yes; we can furnish that to you.

As an item of information I might say that during last year, as compared with the year before, there were 1,747,000 carloads of grain inspected by licensed inspectors as compared with 1,472,860 in the previous year, or an increase of nearly 20 per cent by licensed inspectors.

Mr. ANDERSON. What was the corresponding increase in the number of licensed inspectors? Was there any?

Mr. MORRILL. Yes sir, there was a slight increase. In 1919 we had 143. In 1920 we had 158. In 1921 we had possibly one or two more.

Mr. ANDERSON. I just wanted to get an interpretation of that increase.

Mr. MORRILL. Well, I don't know how to answer the question. It is an actual increase in the volume of inspecion as handled by the licensed inspectors.

Mr. ANDERSON. What I want to get at is this—was that because there was an increase in the number of shipments, or was it because there were more licensed inspectors or an extension of the licensed system or what?

Mr. MORRILL. I don't think it is due to an increase in the number of licensed inspectors except to a very, very small fraction of the whole problem. I think it is simply due to an increase in the demand for inspection. I don't know to what extent the actual movements of grain might affect that.

Mr. BESLEY. I think the answer is that under the grain standards act the outlying points, the smaller terminal markets, can have a licensed inspector established there, and they can ship their grain on Federal grades, so to speak, from these smaller points; such points as Amarillo, Tex.; Wichita Falls, Tex. Those are good illustrations, taking it away from the larger terminals and shipping it more direct from the country points.

Mr. MORRILL. Mr. Besley does not mean that that comes about through an increase in the number of inspectors but an increase in the territory throughout which the district inspectors operate by going out to these outlying points and making inspections.

Mr. WASON. That might mean more inspectors, might it not. because these inspectors take some time to travel?

Mr. MORRILL. Well, as a matter of fact, there hasn't been any material increase in the number of inspectors in the last year, because every man who inspects grain for shipment in interstate commerce must be licensed, and we would know that way whether there had been an increase or not.

Mr. Wason. In the last two years you have had an increase of 20?

Mr. Morrill. In 1919 I do not have the number of inspectors, but in 1919 there were 143 inspection points. In 1920 there were 159 inspection points. In 1921 I haven't the exact figures, but there are about 160, or an increase of about 2. Have you any figures of the increase of the number of inspectors within those points, Mr. Besley?

Mr. Besley. I haven't the exact figures with me, but the idea is this, that while there was a very large increase in the number of inspection points the increase in the actual number of inspectors was practically nil. That is due to the fact that these small points that I mentioned maintained only one inspector as against the larger departments maintained by the States or at the large terminal markets, such as Peoria, Indianapolis, etc.

Mr. Anderson. In those cases at the local points who is the inspector? Is he a local buyer?

Mr. Morrill. No, sir. He is an inspector who operates independent, on a fee basis, or he may be an employee of a commercial exchange. Under the law he can not be a local buyer. No man can be licensed under the grain standard act who is engaged in the grain business. He must be either a salaried or a fee employee of an organization or, where he is operating on a fee basis, of anybody who wants to use his services. As a matter of fact, we require that every inspector inspect grain without discrimination for anybody who applies under like circumstances and conditions.

ASSISTANT SUPERVISORS.

Mr. Anderson. What are these people that you have scheduled as assistants?

Mr. Besley. Assistant supervisors, do you mean?

Mr. Morrill. No; they are listed here 17 assistants in 1922, and 20 assistants in 1923.

Mr. Besley. They are the assistants in Federal grain supervision. The nature of work done by them ranges from semiclerical to technical, requiring legal training for law enforcement purposes. I have in mind the enforcement division at Chicago. Our assistants in Federal grain supervision at Chicago do executive work requiring for the most part legal training. We have some technical people here in Washington handling appeals and other records who are classified as assistants in Federal grain supervision.

Mr. Morrill. In connection with the enforcement of the grain standards act, not only the grain supervisors who handle appeals and the supervision of inspections by licensed inspection, but also we have several men whose duty it is to run down evidence of violations of the law. Wherever grain has been shipped after inspection from an inspection point, or wherever the grading of grain has been misrepresented, or in any other way the law has been violated, this enforcement section of the grain standards act, he is used for getting the evidence and preparing it in shape for submission to the solicitor of the department or, if necessary, to the Department of Justice.

CHAUFFEURS.

Mr. ANDERSON. I notice you have got a couple of chauffeurs down here, too.

Mr. MORRILL. Yes; we have about three machines in a number of markets in order to get around to these yards, in getting samples and collecting them and bringing them into the laboratories. I will ask Mr. Besley where these two particular chauffeurs are located.

Mr. BESLEY. At Chicago.

Mr. MORRILL. At Chicago, both of them. That is the most difficult market we have to deal with from that standpoint. We have machines at more markets than that. It just happens to be that those are two chauffeurs that we use there. In other cases the sampler or supervisor, or whoever happens to have to go around, has to drive his machine himself.

Mr. TAYLOR. By having a chauffeur, does one machine serve a large number of samplers?

Mr. MORRILL. Yes; the gathering of samples and the carrying of samplers and others around, using the machine to a much greater extent than would be the case if we were dependent entirely upon the man who had to do the work in the yards.

In connection with the grain standards act, as in the case of all other regulatory work, there is necessarily very close relationship between the enforcers of the law and the investigational and demonstrational and educational work of the Bureau of Markets. We are to a large extent dependent upon the building up of that research and demonstrational work to make the regulatory work fully effective. Frequently a problem arises in connection with the enforcement of these regulatory laws that must be investigated from a purely investigational standpoint, and the work is of a continuing nature. When once you have the standards established, as we have in the case of wheat, corn, and oats, that does not mean the end of that work. It is really just a step forward.

Referring back to the point that the chairman made earlier in the hearings, it is a fact that the more standards you have the more investigational work you have to do. It might as well be understood that that will be the case, because new questions are continually coming up, and they can not be answered by a declaration by the Government that a certain thing is so. The Government must have the facts to back up this declaration. Those facts can be ascertained only by investigation by competent people.

When it is asserted, for example, that grain standards ought to be changed so as to modify the moisture content requirement, it does not suffice for us to say that the moisture content requirements were the best judgment we had at the time the standards were established. We must be able to show from the standpoint of actual experience and application whether those moisture content requirements continue to be justified, and if the facts show that they are not justified, then of course we ought to change the standards. But that work must go on continuously. I am using only one illustration.

CLEANING FOREIGN MATERIAL FROM WHEAT.

Another illustration is a condition of this kind: In the work of the Bureau of Markets there has been developed a machine called "deck recleaner," set up on a thrashing machine for the porpose of cleaning the foreign material out of the wheat, and I am told by our people of the grain division that that is a very successful machine. It works very well; that on the part of machinery manufacturers there has developed considerable inquiry and a certain amount of demand for something of that kind. The cost of it from a purely investigational standpoint is rather high.

I think it is somewhere around $600, but it is said that the machine can be manufactured on a commercial scale for perhaps $300. It will be readily seen that if that machine is put into commercial use, it will practically eliminate dockage as a factor in grain grading, if it is actually used and the dockage kept on the farm.

It has been asserted, as you know, in Minnesota, that certain foreign seeds, irrespective of this dockage question, can be more thoroughly and easily cleaned out than they are usually by elevators and mills. Whenever that comes to be a fact, the problem of the treatment of that question of grain standards will become an entirely different one from what it is now.

Then it is asserted that in the case of wheat, for example, there ought to be a gluten test in connection with the determination of the proper grade of wheat. It is practical to have a requirement as to gluten in the grain standards until there has been developed a practical, sure way of determining the gluten content, and that is a matter upon which our investigational project is working.

In the case of flax, in the development of grades for flax, the question there was the matter of determining the oil content, and that is an important one. There are quite a number of other illustrations of investigational work that must be done continually, regardless of the existence of the grain standards in their present form.

GLUTEN TEST IN WHEAT.

Mr. **Wason**. May I ask what the object of the gluten test would be in wheat?

Mr. **Morrill**. I am going to ask Mr Besley to answer your question. What would be the object of having a gluten test of wheat?

Mr. **Besley**. The strength, the quality of the gluten, as well as the quantity, is the one thing in wheat which determines its relative value, and if the amount of gluten is known, and the quality is known, it goes far in determining the intrinsic value of the wheat.

Mr. **Wason**. Does the miller pay any attention to the gluten in the wheat, as he manufactures it for human consumption?

Mr. **Besley**. Yes, sir.

Mr. **Wason**. And takes all the gluten out that he can, does he?

Mr. **Besley**. It is the desire to get as much gluten, and as strong a gluten in a flour as possible, and therefore he buys wheat with that in view.

Mr. **Wason**. In the milling process in the making of flour for consumption, does he not take all the gluten out of white flour that goes into the market?

Mr. **Besley.** No, sir.

Mr. **Ball.** Gluten is what makes the bread rise and doughy. Corn meal will not rise.

Mr. **Wason.** Do you know what the percentage of gluten is in ordinary commercial flour?

Mr. **Besley.** In ordinary commercial flour?

Mr. **Wason.** White flour?

Mr. **Besley.** It varies in proportion to the grade of the flour. I suppose a fair average would be 10 to 12 per cent.

Mr. **Wason.** What would be the percentage of gluten in the whole kernel of wheat, if it was a fair-average kernel?

Mr. **Besley.** Above that probably.

Mr. **Wason.** How much would the amount known as shorts or bran contain?

Mr. **Besley.** The form in which gluten would appear in shorts and bran would not be the same as in the flour. It would not be the same gluten. I do not know that I make it clear.

Mr. **Wason.** As I understand you, all the gluten in the kernel of wheat is in the flour, and in the shorts?

Mr. **Besley.** Yes, sir.

Mr. **Wason.** You do not think the bran or middlings contains but a small percentage of gluten?

Mr. **Besley.** No; it contains but a very small percentage of gluten.

UNIFORMITY IN GRADING BETWEEN MARKETS.

Mr. **Morrill.** One of the main problems in the enforcement of the grain standards act is that of uniformity between markets. It was the hope of the grain trade, when the grain standards act was passed, or before it was passed, that through Federal legislation they would obtain something by which a certificate for a particular lot of grain would hold good throughout the shipment of that grain, whereever it might go. That might have been obtainable under a single inspection system, such as a Federal system might have been. It is not completely possible under a Federal supervision system, where the inspectors, who determine the grade in the first instance, are not employees of one authority. But we can make, and have made, a great deal of progress in bringing about uniformity.

As an illustration, during the first quarter of the last year, Federal corn standards were applied by inspectors at New Orleans, with an accuracy of 76 per cent, as against 95 per cent during the last quarter of the same year, which is a distinct improvement in the accuracy of those inspectors in that particular market.

When it comes to uniformity between the inspectors in one market, and those in another market upon the same lots of grain, of course that will increase to the extent that we are able to bring about accuracy in a separate market, or it will decrease to the extent any separate market fails to measure up to what ought to be a reasonable standard. For example, I was shown figures on 575 cars, passing between Kansas City and other markets, in which the percentage of uniformity was 92. I would not say that holds good throughout the United States for all inspections, but it serves to show what we are aiming at through the enforcement of the grain standards act.

They are, of course, not only the factors involved in the fact that we do not employ or directly control the license inspectors themselves, but also the factors of which deterioration of the grain in transit should naturally result in a different grade at other markets, and I will read a portion of a letter received from the secretary of the Texas Grain Dealers Association in regard to a complaint recently made in the southwest in differences of the grades placed by inspectors at different points:

> The letter explains the situation fully in regard to this territory, except I find after thorough investigation that there may be an explanation for some of the variations in grades of the different inspectors, supervisors, and board of review.
>
> I have ascertained that there was a rain during threshing season in the Pan Handle, that wheat stored in elevators and not properly handled has developed heat damage. Likely the extent of the heat damage has been intensified by grain remaining in the box cars so long while in transit to Galveston and Texas City, on account of almost continuous embargoes at those ports, and particularly Galveston. It may be that these good people did not give this feature full consideration. This, I think, will be born out by investigation of the inspections of grain passing from one terminal market to another, where it is hardly possible for a transit deterioration to take place. At least, the Federal supervision is a great deal more satisfactory than the old way of grading by each terminal market establishing its own grades and changing them to suit conditions. Our association, I am sure, and the grain and milling trade throughout the country is very much in favor of these standards established by the Federal authorities governing the handling of grain, and do not desire the lowering of any of these standards, but feel sure that they would prefer higher standards.

He goes on with reference to the question of funds for enforcing this law, and expresses this opinion:

> I am rather of the opinion that quite a good deal of the compaint is due to the development of heat damage, as above explained, and principally with those who have large stocks of this wheat on hand, particularly at Galveston. From reliable sources I have information that, on account of congested conditions at Galveston, wheat was permitted to stand on track in that humid climate for weeks and months sometimes, until the elevators there are full of badly damaged wheat, principally heat damage, and that they have not permitted shipment of any wheat through Galveston for some time, except on appeal, supervisor's grade No. 2 or better. No doubt a large number of exporters and jobbers are interested in this kind of wheat.

That is an independent opinion, expressed by the Texas Grain Dealers' Association, about problems of Federal grain supervision. It shows that there will be differences between grades at different markets, the explanation for which may not always appear on the face that there are those differences. Sometimes, and this to a large extent, the differences may be due to actual differences between the application and judgment of inspectors in another case, to such causes as that. It would not be possible, however, under the present theory of the grain standards act, to bring about 100 per cent of the grain trade desired, and that is a certificate holding good wherever the grain goes, because in every market there is an independent inspection department, which owes no obligation to the grain trade in any other market, and is dependent on its support for fees it gets for the grading of grain in its own market.

ADMINISTRATION OF UNITED STATES WAREHOUSE ACT.

Mr. ANDERSON. We will take up the next item, page 236, administration of the United States warehouse act.

Mr. MORRILL. In the case of the administration of the United States warehouse act there is a request for an increase of $47,220. No increase in statutory roll. Last year, if I remember correctly, we asked for an appropriation of $100,000, and the amount allowed was $80,000, based upon our belief that the work under the warehouse act would necessitate the expenditure of that amount of money. Our experience has fully justified the estimate that we made at that time. As a matter of fact we are now faced with the necessity for deciding whether we will continue to accept any more applications under the warehouse act before the end of this fiscal year. We can not do it unless additional funds are provided. We have reached the limit, as far as we can see it, of the ability of our inspectors to get around to the different warehouses licensed under the warehouse act and give them the requisite inspection.

On April 1, 1920, we had 23 cotton warehouses, with a capacity of 40,050 bales.

Mr. BUCHANAN. How many warehouses?

Mr. MORRILL. Twenty-three; and five grain warehouses, with a capacity of 136,000 bushels. On April 1, 1921——

Mr. LEE. What year was this?

Mr. MORRILL. April 1, 1920. One year later, April 1, 1921, we had 238 cotton warehouses, with a capacity of 429,975 bales, 56 grain warehouses, with a capacity of 2,108,400 bushels, and 5 wool warehouses, with a capacity of 24,375,000 pounds.

At the present time we have 264 cotton warehouses, with a capacity of 1,250,000 bales, 274 grain warehouses, with a capacity of 14,000,000 bushels, 18 wool warehouses, with a capacity of 33,000,000 pounds, and 6 tobacco warehouses, with a capacity of 3,820,000 pounds. We have an application pending for a grain warehouse with a capacity of 1,500,000 bushels. We have an application pending for a tobacco warehouse at Lancaster, Pa., and an application pending for a large cotton warehouse at New Bedford, the possibilities of which would be around 175,000 bales; but we do not know how much they want to have licensed.

In addition, we have been informed that the Burley Tobacco Growers' Association has recently organized and wants to have inspected and licensed about 40 tobacco warehouses, and that a little later on the North Carolina people will want a large number of tobacco warehouses licensed. The only way we will be able to handle those, if at all, will be through the assistance of the State authorities, if they can spare it, and through the possibility of relief of the warehouse act of some of the expense that is now being incurred for the tobacco standardization work.

In order to give you an idea of what it means to carry out the purposes of the warehouse act, there must be in the case of each warehouse, for which an application is made, an initial inspection before the license is issued to determine its suitability for the storage of the particular commodity, to ascertain the reliability and business standing of the warehouseman, to determine whether he is capable, and whether he is actually keeping an adequate statement of accounts, or will do so, and certain other incidental information that will be necessary before we feel we can safely license such a warehouseman.

After being licensed, it is our policy to give at least four subsequent inspections in each year to each warehouse that is licensed, for the purpose of seeing whether they are complying with the regulations, checking up their stock against outstanding receipts, checking up the receipts that have been returned, to see that all have been returned before deliveries have been made, and determining other facts that would be of interest to the banks and insurance companies, and ourselves.

In the case of a cotton warehouse having a 30,000 bale capacity, of which we have three, it takes approximately two men for a week to make an adequate inspection. We have all of these warehouses in approximately 33 States in the United States, and the force that we have to use for the purpose is limited. Probably the traveling expense per man is greater than it would be if we had more men, and greater than it will be with an enlargement of the system. The salaries of the men are, as shown by the estimate, very low. I think I explained about those salaries last year, but by looking at the estimates you will see they begin at $1,500 and run up to a maximum of $3,000, with the exception of the project leader, who gets a little more. Most of the men are $2,500 and less. Those men have to be competent for our purposes, not merely to inspect the warehouse for its physical condition, and to check up the number of bales of cotton against the receipts outstanding, but to check up the accounts of the warehouseman, to see if he is carrying the insurance his receipts call for, and if he is maintaining a condition of solvency. They must be able to go to a bank and deal intelligently with the banker, and also with the insurance company on the matters that they are interested in, that arise in connection with the warehouses. All that is necessary to maintain the stability of the receipts, because the banks and insurance companies attach just as much value to the receipts as they have placed in our subsequent inspections.

LAX CONDITIONS EXISTING IN WAREHOUSES.

Mr. **Anderson**. In this cotton warehouse business, it has been exceedingly loosely conducted, has it not?

Mr. **Morrill**. Yes, sir.

Mr. **Anderson**. Some gentleman was telling me in connection with cotton warehouses that he had examined, that there were hundreds of cases in which delivery had been made, and which a return of receipts had not been gotten, and all sorts of things of that kind.

Mr. **Morrill**. We have had some very unfortunate experiences in the cotton warehouses.

Mr. **Lee**. In bonded warehouses?

Mr. **Morrill**. No, sir; not in bonded warehouses. There have been no such cases in bonded warehouses, but, for example in Georgia a couple of years ago, there was a failure of a man in the cotton business, who was operating a warehouse, and he had receipts for 4,000 bales of cotton outstanding, no cotton in the warehouse, and we heard of banks in North Carolina and Virginia who had those receipts in their possession. I do not know how the matter has come out, whether they were able to reimburse themselves, but they can look to the borrowers on the receipts to some extent, but that sort of thing has happened many times in the cotton industry, and the bankers are beginning to realize that a warehouse receipts needs more than a casual inspection.

It needs something back of it to enable them to rely on it for the purpose of making loans. It is the same way with insurance companies. They are beginning to realize that they have a great interest in the reliability of the warehouse man, and in whether he is living up to his obligations under the receipts. That is the reason that the Southeastern Underwriters Association granted a credit of 25 per cent on cotton in warehouses. The Texas State insurance commissioners increased the allowance from 10 to 15 per cent for cotton in licensed warehouses. It is the reason why we find that banks are discriminating between licensed and unlicensed receipts, not in the rate, but whether or not they will make a loan. Mr. Yobe brought to my attention a letter which was received from a man in the South, who said that while in New Orleans some time back:

> I negotiated a loan through one of the banks there, giving as security warehouse receipts for cotton. Among the lot were a few not bonded, and to my surprise the banks threw them back on me and refused to accept them as collateral, but raised no objection to the bonded receipt at all, etc.

That is not an isolated instance. We hear from time to time that differentiation is being made by the banks between licensed and unlicensed receipts.

Mr. Buchanan. Both are recognized under the act.

Mr. Morrill. Licensed and bonded is a term that applies to the same warehouse. They are both licensed and bonded. They are the same thing.

Mr. Buchanan. Both are licensed and bonded?

Mr. Morrill. Yes, that is to say, in order to receive a license they must be bonded. A warehouseman can not receive a license unless he is bonded.

Mr. Buchanan. I thought you said none occur in bonded warehouses?

Mr. Morrill. Speaking of the United States bonded warehouse act.

Mr. Wason. That meant licensed.

Mr. Morrill. Yes.

Mr. Buchanan. There is no shortage under your supervision?

Mr. Morrill. No.

Mr. Buchanan. Shortages occurred in some State warehouse that you had nothing to do with?

Mr. Morrill. In a private warehouse.

Mr. Buchanan. In a private warehouse?

Mr. Morrill. Not State warehouses, as such. The State of Louisiana has a very fine warehouse at New Orleans, and I do not think anybody would question its reliability.

Mr. Anderson. It is a question in many cases of lax business methods.

Mr. Morrill. I can give you an illustration. Some years ago in Memphis there was a warehouseman who received a large amount of cotton, handling it for certain customers. He did not own it, but he was under the domination in a business sense of certain men in the cotton business, and I am told the way he got into trouble was that his principal depositor would call him up and tell him he wanted some cotton delivered out, and that he would send the receipt down to him later, and in the first instance he relied upon him, and d deliver the cotton out, and did not get the receipts. It went from bad to worse, and finally he went into bankruptcy, and some of the banks found they had receipts upon their hands.

Mr. **BUCHANAN**. That is the tale he told. The cotton business is too big a business for a man to do that.

Mr. **MORRILL**. This is what was told to me by one of the bankers who was involved in it.

Mr. **BUCHANAN**. I have got no charity whatever for warehouses who lose bales of cotton. They are too big to lose.

Mr. **MORRILL**. Do not misunderstand me. I am not indorsing what he did. I am speaking about the way he started.

Mr. **LEE**. That big failure was at Atlanta, Ga., was it not?

Mr. **MORRILL**. It was not in Atlanta.

Mr. **LEE**. Willingham?

Mr. **MORRILL**. Yes.

Mr. **LEE**. I happen to know something about that.

Mr. **MORRILL**. That sort of thing causes a periodical disturbance upon banking and insurance, and after that failure the Federal Reserve Bank at Atlanta circularized all its members about getting in touch with the licensed warehouse system, and there is a working relation between us and the Federal Reserve Bank in Atlanta particularly. We furnish to them a copy of every subsequent cotton warehouse inspection report we make, and they check them against any receipts they have in their possession. We furnish a copy of that report to the underwriters' association in that territory.

DEFICIENCY IN COTTON STORAGE SPACE.

Mr. **BUCHANAN**. To what extent do applications come in for establishment of new cotton warehouses?

Mr. **MORRILL**. I think we seldom, if ever, have a case of a newly constructed warehouse; not very many.

Mr. **ANDERSON**. Are not the cotton warehouse facilities outside of the port points in the South decidedly deficient?

Mr. **MORRILL**. Deficient as to quality and deficient as to location, yes; not deficient as to capacity.

Mr. **ANDERSON**. The capacity is in the wrong place?

Mr. **MORRILL**. Yes, and it is not of the best character. In one State the head of our warehouse division found a very limited amount of satisfactory storage space for cotton, notwithstanding the fact that that particular State is a large cotton-producing State.

Mr. **BUCHANAN**. There is not warehouse capacity in Texas to supply one-fiftieth of the cotton raised there; it is lying all over the ground in the yards and around the stations, and stays around in town to town, and even rots.

Mr. **MORRILL**. There is a great deal of room for improvement of warehousing in the South. At one time, under the warehouse act, we had a man engaged upon the development and distribution of standard warehouse plans, but the increase in our inspection work made it necessary to discontinue carrying him, and the State of North Carolina employs him now.

Mr. **ANDERSON**. Has there been any survey of the cotton warehouse situation?

Mr. **MORRILL**. No comprehensive survey of the cotton warehouse situation since 1914 or 1915. Mr. Yohe went to Oklahoma and made a complete survey of the Oklahoma situation about a year ago, a little less than a year ago, not only as to cotton, but as to agricultural commodities, and we have his report, but to make a comprehensive survey would be a very expensive undertaking.

Mr. ANDERSON. Did not the Council of National Defense of the War Industries Board make a survey?

Mr. MORRILL. I think so.

Mr. ANDERSON. And in 1917?

Mr. MORRILL. Yes, sir. I do not think that was a comprehensive survey, however. It was not on the ground of a comprehensive survey, but it was a compilation of available information, and we know that a compilation of available information is a very unsatisfactory thing, because it does not show the actual facts. The only way that we feel we could undertake a survey of the warehouse facilities in the United States would be in cooperation with the States themselves. That is to say, having the States do it under a plan which we might devise, and under our supervision, in order to get comparable results.

Mr. ANDERSON. Do you happen to have any information as to railroad cars being used for storage purposes?

Mr. MORRILL. I do not think we have ever gotten up information along that line. Of course, there would be some use of cars for that purpose, but I do not know to what extent that might exist. It would be purely temporarily, at best, and they could not get any receipts.

Mr. ANDERSON. It is not so much a storage problem as it is a transportation problem?

Mr. MORRILL. I understand that. You have the problem of insurance and borrowing money, and you can not borrow money on cotton in railroad cars, unless you are a very strong firm, and have an independent banking standing, which will justify a bank making a loan of that kind. My own feeling, for a number of years, has been that we are unfortunate in not having a complete survey of warehouse facilities in the United States, with respect to location, character, and capacity, and I have thought for a long time that something should be done along that line, but it is an expensive undertaking, if it is to be done right.

LICENSED WAREHOUSES.

Mr. ANDERSON. These warehouses that you have licensed are pretty well scattered?

Mr. MORRILL. Scattered with respect to the number of States, yes. There are 33 States in which they are located, but to some extent they run together considerably, for example, in Georgia, we have 123 licensed cotton warehouses. In the State of Washington we have 166 grain warehouses. Those are the States in which we have the largest number of licensed warehouses.

Mr. BUCHANAN. How many have you in Texas for cotton?

Mr. MORRILL. Twelve in Texas for cotton, and I think they are all for cotton in Texas. I do not think they have any other commodity licensed in Texas. Of course, the problem presents itself differently when you consider the number from what it presents itself when you consider the size of a warehouse. Take the 30,000 bale warehouse at New Bedford, the only one in the New England States. We handled the inspection, by sending a man from Washington, who spent a week in inspecting it, and came back to Washington. In the case of the Washington grain warehouse, we handled the inspection by a man on the Pacific coast, who goes from warehouse to warehouse, as fast as he can travel. You can see the difference between the two problems. In Georgia, we have quite a concentration of licensed warehouses near Atlanta, and we used a Ford automobile truck to get around. Sometimes there are two warehouses in the same town, and the towns are close together.

INSPECTIONS OF WAREHOUSES.

Mr. **Anderson**. Did you say that you figured on four inspections a year?

Mr. **Morrill**. We ought to, but we can not make them, unless we quit taking applications

Mr. **Lee**. You should not make less than four?

Mr. **Morrill**. Certainly from the standpoint of the purpose of the warehouse act, it is not safe to make less than four.

Mr. **Anderson**. Does that mean a checking of the books and receipts with the stuff in the warehouse, the whole business?

Mr. **Morrill**. Yes, sir. A further development is a system of checking the accuracy of the grading that is done, for example, in the cotton section we have a man who is an expert cotton classer, and he goes from warehouse to warehouse to check up grading. Fortunately for the system, he found the grading was uniform. That might not be the case if we did not keep following it up all the time.

INVESTIGATION OF DETERIORATION OF COTTON.

Mr. **Buchanan**. Has the department, in any of its branches, ever made any investigation of the deterioration or difference in the value of cotton, one stored in the warehouse, and the other laying on the ground?

Mr. **Morrill**. Yes, sir; we have. We have made those tests. I thing it was year before last, we made a test, a series of bales of like kind, under different conditions, for example, one bale lying exposed to the weather for six months in the winter time, without being turned, and uncovered, and bales under other conditions, bales covered, bales covered with tarpaulin, and bales in standard warehouses, and my recollection is that in the case of the bale lying on the ground, without being covered, the loss on that bale, weighing over 500 pounds, was something like 274 pounds damage, as against no loss on the bale in the warehouse. It takes only a very easy calculation to show how much better it would have been to have stored that bale in a warehouse.

Mr. **Buchanan**. That is at least 50 per cent of the value of the cotton?

Mr. **Morrill**. Yes, sir. We are following that up in the investigational work of the department, taking damaged bales, under those various conditions, and running them through mills to determine the exact effect upon the spinning qualities of the cotton which has been exposed to the weather.

Mr. **Buchanan**. Even upon the bale of cotton?

Mr. **Morrell**. Yes, sir. That has not been completed, but it is in process.

Mr. **Buchanan.** When those facts get before the cotton raisers' they will get a move on them and build some warehouses.

Mr. **Morrill.** We have published that proposition, to show a man the value of it, the value of the damaged cotton at the current price, as compared with what it would have cost him to have kept it in the warehouse for the same period of time.

SIZE OF COTTON WAREHOUSES.

In the case of cotton warehouses I have some figures here showing the range of their size. We have 18 warehouses of 5,000 bale capacity each, 5 of 6,000, 4 of 7,000, 4 of 8,000, 1 of 9,000, 11 of 10,000, 1 of 11,000, 2 of 12,000, 1 of 13,000, 4 of 14,000, 7 of 15,000, 1 of 18,000, 2 of 19,000, 2 of 20,000, 2 of 22,000, 1 of 25,000, 3 of 30,000, 1 of 40,000, 1 of 52,000, and 1 of 75,000 bales capacity.

Mr. **Lee.** Where is that located?

Mr. **Morrill.** Do you mean the warehouse with a capacity of 75,000 bales?

Mr. **Lee.** Yes, sir.

Mr. **Morrill.** Clarksdale, Miss. The Memphis Terminal Corporation, of Memphis, Tenn., has a capacity of between 250,000 and 300,000 bales. The vice president and general manager of that concern was in favor of the warehouse act from the beginning, but was not able to secure the approval of his directors until recently; as a test, 10,000 bales were put in a section of the warehouse, and were placed under the licensing system, purely as a test. Our information is that he is satisfied with the test. If that should prove to be the case, and his directors should sustain him, they would want to place the whole warehouse under the warehouse act. As it is right now, we have 1,250,000 bale capacity in licensing warehouses, and if you do a little figuring, that is pretty important.

It is believed that normally there is not more than perhaps a third of a cotton crop in storage at any one moment of time, and if you take the average crop of 12,000,000, one-third is 4,000,000, and we have capacity for 1,250,000 bales.

In the case of wool, we have something like one-sixth of the total wool crop in the United States provided for in licensed warehouses.

Mr. **Lee.** You allow them to store other things in that warehouse?

Mr. **Morrill.** They are permitted to store other commodities, provided they do not increase the hazard. Those other commodities are not covered by the license, and they can not issue a licensed warehouse receipt for those commodities but only those specified by law.

FEDERAL RESERVE BANKS HAVING INSPECTION SYSTEM.

The Federal reserve bank at Atlanta attaches so much importance to the supervision of warehouses, that it maintains a warehouse inspection system of its own. I believe that it is contrary to their policy to make a loan upon warehouse receipts that are not issued by warehouses covered either by their own inspection or our inspection, and they have been continually recommending to cotton warehouse men that they take out licenses under the United States warehouse act. The bank's own inspection force does not cover warehouses licensed under the act, but the bank accepts our inspections.

The Federal Reserve Bank at Dallas is also in the same general attitude toward the Federal warehouse act. They take the view that as far as possible member banks should favor United States licensed and bonded receipts, if they can get them, and they have asked their members to bring that about. The licensing of warehouses in that State has not progressed as far as in other States, partly because there is a State warehouse system there, but, as the Federal Reserve Bank at Dallas pointed out, it serves only as establishing a standing for those warehouses in the State of Texas, and does not satisfy the needs of the banks outside of Texas which accept warehouse receipts. The State system is not exactly understood by bankers outside of Texas, and there is a further fact that the State warehouse system has only two inspectors for about four hundred warehouses, so that it is readily seen that two inspectors can not satisfy the requirements of the banks within the State.

Mr. ANDERSON. Is there a fee charged for the issuance of the license?

Mr. MORRILL. We charge a fee of $2 for each license. It is fixed in the law, and a charge of from $5 to $50 according to the size of the warehouse for the original inspection upon which the issuance of the license is based. There is no subsequent inspection charge made, and while I feel that it would be very desirable, if possible, for the licensed or bonded warehouse system to maintain the expense of supervision, under present conditions, that is not possible, because it is wholly a voluntary system, and because the warehouseman is not the man who gets all the benefit out of the system. In other words, frequently his entrance into the system is brought about by pressure of banks, insurance companies and depositors looking at it from a loaning or insuring standpoint and he may see the benefit to himself individually and pay the expense. In fact, by the time he pays from $5 to $50 for inspection, and $2 for his license, and a premium of 1 per cent on the surety company's bond, he feels that he has incurred quite a burden. The situation might be different if the warehousing system were part of the banking system of the country; then there might arise the possibility of making the system carry its own expense, just like the national banks do.

The Federal reserve banks at Atlanta and Dallas are not the only ones who have indorsed this system. The St. Louis Reserve Bank and the Richmond Reserve Bank, and others, have indorsed it, and the St. Louis Reserve Bank is responsible for some of the warehouses in Mississippi and near by southern points having come into the system.

While we have applications and have issued some licenses for tobacco, and expect to be called upon to issue licenses for quite a number of additional tobacco warehouses in order for them to get the benefit of Federal approval and inspection, the tobacco side of the work will not reach its full value until tobacco standards have been established for grading tobacco, and thereby give it a market quotation standing. During the past year we started a development of tobacco standardization work, in cooperation with the various States. Mr. Tenny mentioned that in talking about the marketing distribution item.

A part of the expense something like $4,000 or $5,000 is being paid under the warehouse act, in order to get the work along, and keep it going as fast as is possible, with a hope that after the first year's investigation we can have some tentative grades, and we are being called upon constantly by the States and the cooperative organizations, and the trades, too, to get that tobacco standardization work under way and done as soon as possible, because they realize the necessity of it, if the full purposes of the warehouse act are to be accomplished.

Are there any further questions you want to ask?

Mr. ANDERSON. Where are the grain warehouses located?

Mr. MORRILL. These grain warehouses are located in the States of Michigan, Colorado, Idaho, Kansas, Ohio, Indiana, Illinois, Nevada, Oregon, California, Iowa, North Dakota, Missouri, Utah, Pennsylvania, New York, Arkansas, Washington, and Tennessee; 275 warehouses in 19 States.

CENTER MARKET.

OPERATION AND MANAGEMENT.

Mr. ANDERSON. Take up the item on page 274, Center Market, District of Columbia.

Mr. MORRILL. In the case of Center Market, that is a matter like the wool work of the department, which was wished onto us without any request on our part.

Center Market is located in Washington, at the corner of Seventh and Pennsylvania Avenue, runs from Seventh and Pennsylvania Avenue to Ninth Street, through two city blocks. The building is located on land which belongs to the United States, and for some time past there has been more or less agitation in the District about that market, and it has resulted in the introduction or passage of a bill (I believe Representative Johnson of Kentucky, had as much as anybody to do with it) to take over Center Market building and facilities from their present owners, and place the market in the hands of the Government, and the Department of Agriculture was selected as the agency to run the market after it was taken over. It was provided in the law under which the market was taken over that the physical improvements on the land should be valued by a commission appointed by the President, and that that commission should make an award, and upon the filing of that award in the courts of the District of Columbia, the title to the Center Market should vest in the Secretary of Agriculture, and from that time on he should operate the Center Market, collect the rents, and other kinds of incomes, pay the expenses, etc. The period of time within which the commission can finish its work expires on April 4, and the commission has finished taking testimony in regard to the valuation of the property, and may at any time from now until April 4 make its award.

An appropriation of $75,000 was made for the operation of the market during the remainder of the fiscal year, whenever the title vests in the Secretary of Agriculture. The estimate which we have made for the year ending July 1, 1923, is $175,683, and that is for the purpose of covering all of the expenses of the market as a going concern.

The market is considerable of a proposition, because there are one hundred and eighty-odd tenants of different kinds in it, who deal in practically every form of commodity, fruit, vegetables, notions, meats, and a lot of other things. There is a restaurant and auditorium, not exactly an auditorium, but a place used for amusement purposes, bowling alleys, and there are offices used for office purposes, everything that you can think of, and there is a cold-storage plant, the only one in the District of Columbia where freezing temperatures may be maintained, 500,000 cubic feet, if I recall the figures; so that every phase in the operation of the market and a cold-storage plant is put up to the Secretary of Agriculture. We have through the medium of Mr. Kitchen and Mr. Franklin, of the Bureau of Markets, made a very careful study of the operations of that market under its present owners.

Their expenses and the division of those expenses, the purposes for which those expenses were incurred, the earnings and sources from which the earnings are derived, the methods of operation, and the present physical conditions of the market with reference to what would be required for its repair and improvements, and we have arrived at an estimate of $175,683, which estimate has been presented to you on the basis of that information.

That does not call for any larger force to operate the market in the aggregate than the Market Company now has. Nor does it, for the same item, call for any increase over the Market Company's present expense of operation. According to our information the revenues from present operation of the property will run around about $280,000 a year, and that would be somewhere in the neighborhood of $80,000 or $85,000 a year difference between the cost of operating it, as we expect it to be, and the receipts, provided that the latter remain the same during the coming year as heretofore.

Mr. ANDERSON. It should be less, because they paid $33,000 for taxes and you do not pay anything?

Mr. MORRILL. That figure, $258,000, does not cover the taxes. The taxes are not paid out. That is a gross receipt.

I think I can give you the details of that in a minute. According to a statement which they filed before the commission for the valuation of the property, for 1921 they had actual gross receipts of $269,000, and they had gross expenses of $193,000, of which $26,000 was taxes, $1,356 was insurance, and $2,159 was interest. Their operating profit, as they spoke of it, was $75,000, after paying taxes.

Mr. BUCHANAN. Is this not Government-owned property?

Mr. MORRILL. The land belongs to the Government, and the building will belong to the Government when the commission completes its job.

Mr. BUCHANAN. Will the tax item be eliminated?

Mr. MORRILL. Yes.

As to whether the investment—if we may look upon it as an investment—will be a profitable one to the Government or not, we can not say at this time, because the Washington Market Co. asks for approximately $2,000,000 as an award for the value of that property, whereas the Government estimate in testimony introduced by the Department of Justice, would show it to be worth $800,000, so you can see why we can not give you any figures as to whether it will be a profitable investment?

Mr. ANDERSON. It was capitalized at $1,000,000.

Mr. MORRILL. $1,200,000—they authorized $1,000,000 capital, and the bonds were $1,280,000. My recollection is that taking the market value of the stock and bonds of the Washington Market, the market value would indicate the value between eight and nine hundred thousand dollars, and they have asked the Government to pay them $2,000,000.

INVESTIGATION OF REFRIGERATING PLANT.

Now, as a matter of fact, as bearing upon what we are going to have to face in operating this market, I have an abstract from the testimony given by the refrigerator engineer of New York City, Mr. Fred Ophuls, before the commission on February 6, 1922:

> I have also found that the various pumps at this plant are not in the very best condition, and I am positive that practically all of them are very wasteful in their steam consumption, due to leaky pistons and leaky valves.
>
> The insulation of the freezing tank is gone; it is useless. It should be entirely replaced. I have therefore eliminated the value of this insulation entirely. Furthermore, I find that the freezing tank leaks, which is definitely proved by the amount of salt which has gathered on the floor on which the freezing tank rests.
>
> An inspection of at least one-half of the ice cans in the tank shows that they are in poor condition. Summing up, I feel that it is placing a high value on this equipment if 50 per cent of its cost, when new, is reserved for depreciation.
>
> As regards item No. 67, the brine cooling tanks, I find that the insulation of these tanks is useless. It is bulged; it freezes through, and for proper economy should be replaced. I have deducted the full value of this insulation for depreciation—$2,050.
>
> The four steam units are from 11 to 21 years old. They are of the slide-valve type, not very economical in the use of steam. Such units are never used today in any plant where steam economy means anything.

Then he makes a further statement:

> It is worthy of note that a considerable part of this high coal consumption is due to the extreme inefficient condition under which the boiler system is being operate most of the period. I also wish to point out that the present design of the boiler system is obsolete, making proper economy in the use of fuel out of the question.

Mr. ANDERSON. Was there testimony offered on the other side?

Mr. MORRILL. Yes; there was plenty of testimony on the other side of those questions. This man Ophuls, while brought here by the Government, naturally had no interest in the matter, and this is testimony of what he saw, whereas the testimony of the market engineer would naturally be in their favor. In other words, we did not introduce Mr. Ophuls. We had nothing to do with his introduction.

Mr. ANDERSON. He was brought here as a Government witness?

Mr. MORRILL. Yes; we did not get him here to bolster up these estimates.

SALARIES.

We made a comparison of what we proposed to expend for salaries with the actual expenditure of the present company for salaries for like purposes. For example, the company had a general manager at $7,500 and a treasurer at $2,400, for which we would not provide at all. We would substitute for the general manager a superintendent. They have a superintendent at $3,600, for which we would provide an assistant superintendent. They have a consulting engineer at $4,800, that we would not provide for at all. In the rest of the positions, we would provide man for man, corresponding to positions, and about the same salaries, except that we would add a clerk in the administrative expenses, a $1,200 clerk. In the engine and boiler room the expense would be almost exactly the same.

Mr. **Anderson**. What is the total roll of the Market Company, and your total roll, exclusive of the engine, boiler rooms, and repair shops, of the cold-storage plant?

Mr. **Morrill**. The total roll for all purposes is $82,736.76, according to our figures, and the grand total of our estimates for the pay roll is $74,443.

Mr. **Anderson**. Would the employees of the market receive $240 bonus?

Mr. **Morrill**. The people who are employed in the market, I suppose, would receive the $240 bonus if it were allowed. I presume they would be treated the same as any other employees on the Department of Agriculture, and that would add somewhat to this figure; that is to say, for purposes of comparison it would, although it would not come out of this appropriation. Most of these people, but not all of them, would receive the $240 bonus.

Mr. **Anderson**. There are 48 or 50 people in this list, are there not?

Mr. **Morrill**. If you have counted the total number of people, there would not be that many people entitled to the bonus; that would be the maximum number who could get the bonus, but naturally all of them would not get it, because there are some people there who are not in the bonus class, either on account of the salary they receive or the fact that they are purely part time employees.

Mr. **Anderson**. Will you put into the record a comparative list?

Mr. **Morrill**. I can give you the comparison from which I quoted the figures, if that is what you wish. I have that exact comparison here.

There are, of course, some figures included in the estimates of outgo for operating the market upon which there would be a direct reimbursement aside from the question of rentals; for example, that provision for a fund for payment of freight, express, drayage and other charges and materials, and the reimbursement of that fund. We think that it would take probably about $15,000 a year to keep that fund going and pay these charges upon stuff coming into the market on consignment to the cold storage department, and upon which we would be reimbursed.

Then there would be reimbursement for electric light and for ice and for some other things—reimbursement as distinguished from the general receipts of the market.

There would be, as I said before, a considerable expense for repairs in all probability in the cold storage plant itself. There will also be a considerable expense for painting and repairs in the market generally, because the market has not been kept up in good shape. I think that that might be partly explained by the expectation that the market company has had that the Government would take it over.

Mr. **Anderson**. The Government will take it over some time between now and the 1st of April, I presume.

Mr. **Morrill**. Yes, sir. The amount of $75,000 that has been appropriated for this year will hardly permit of any repairs at all.

CONTEMPLATED REPAIRS.

Mr. **Anderson**. What repairs and painting are you contemplating doing?

Mr. **Morrill**. I can give you that information. We have an item of repairs to machinery and equipment that we think will probably be necessary of about $4,000. Then, in addition to that, the painting, which we think will amount to in the neighborhood of $13,000, and renovating and rearranging the second floor of the Ninth Street wing, about $6,000, and miscellaneous expense for repairs of about $1,000. We think that is all the repair items.

Mr. **Anderson**. Do you expect to paint the whole building?

Mr. **Morrill**. Inside; not on the outside; that is to say, the interior of the roof and the side walls.

Mr. **Kitchen**. We desire to clean up that areaway in the middle. If you should walk down through there you will observe it is very dirty. It covers three stories. It has not been painted for some time. It is difficult to get at it, and it would be expensive.

Mr. **Anderson**. Does this item of repair to machinery include repairs to the cold-storage plant?

Mr. **Morrill**. That takes in repairs to all machinery, including the cold-storage plant.

Mr. **Anderson**. What are you going to do with the upstairs?

USE OF UPSTAIRS SPACE.

Mr. **Morrill**. The upstairs part of it will remain in its present usage where there are tenants, except one part which is now occupied for amusements purposes, which may be turned either into offices or an auditorium. The expense either way would be approximately the same.

Mr. **Anderson**. Was that not at one time used as an armory?

Mr. **Morrill**. Yes, sir; that has been used as an armory; it was used by the National Guard of the District of Columbia some years ago as an armory.

Mr. **Anderson**. They have not any armory now, have they?

Mr. **Morrill**. Not unless they are using Convention Hall. I do not believe the National Guard has any armory now at all. They used the Convention Hall at Fifth and K Streets for a considerable time.

Mr. **Anderson**. Has there been any consideration given to the use of that space up there again for armory purposes?

Mr. **Morrill**. Not so far as I know. The two ideas that have been advanced would be either that it should be divided up for office purposes or that it should be used for an auditorium. The Center Market act provides that the Government may reserve for its use any portion of the building that it wishes to reserve.

Mr. **Anderson**. Would these offices be used for the Department of Agriculture or rented out?

Mr. **Morrill**. They might be used either for the Department of Agriculture, in case it needed the space, or it might be rented out.

Mr. **Anderson**. It might be, but what are they going to be?

Mr. **Morrill**. That is a matter the Secretary has been giving consideration to. I think the Secretary feels a desire to use it as an auditorium, but he has not, so far as I know, determined his policy on that matter. Do you have any later information than I have, Dr. Ball?

Dr. **Ball**. The only information I have is that the Secretary is giving it consideration.

Mr. **Morrill**. We have figured it both ways so as to meet any decision he might make, and as near as we can figure the cost would be the same either way.

Dr. **Ball**. We have no place now in which we can get our own people of the Department of Agriculture together. We can not have any meeting of our own staff without having to go over to another building.

Mr. **Anderson**. What are the estimated receipts from these rooms if they are rented out to other people; have you got any estimate of that?

Mr. **Kitchen**. We have not figured that, because when we figured it this estimate contemplated its being used for Government offices.

Mr. **Morrill**. That is a question, of course, as to the amount of revenue the Government would get, according to whether rented out or used for its own purposes. Naturally, there would be some revenue for renting the offices which would not be available if the Government used it itself; but we do not figure that that would change the expense we would have to incur.

Mr. **Anderson**. These items you have given me now so far amount to $24,000.

Mr. **Morrill**. I can go right straight down the line and give you all of the items that go to make up the whole.

I have given you for salaries and wages $74,443.

STATIONERY.

For stationery we have put down $2,000. In a way, that is an arbitrary figure, because we were not able to get exact costs of the market company for this item, because they do not keep their books so as to show the exact amount. But we realize there will be a considerable expense for books and for bills and receipts, lease forms and other items of stationery and printing, like the regulations governing the tenants and things of that kind; and we believe that $2,000 would be a reasonable figure for that.

TRAVEL.

We have put down here $500 for travel. That is simply to enable the superintendent of the market company to visit other markets in the country, public and private, for the purpose of studying the methods of operation and of devising any improvements in the operation of the market that might seem to be practical as a result of the experience of others along the same line.

For equipment and material we have put down $4,500, which would go for a small amount of furniture that might be needed, and would be needed, as a matter of fact, in the offices of the administration of the market, which would include some special apparatus in the engine room and the refrigeration rooms for the purpose of making studies of the operation of the cold-storage plant, with a view to determining its relative efficiency and economy, and the needs for any changes or improvements, and also for ascertaining in an exact way the cost of operation of the cold-storage plant, for purpose of comparison with other plants of similar character.

In addition there would be about $3,000 for electrical supplies of all kinds furnished the market, a good deal of which may be reimbursed by the tenants wherever the electrical work is done in connection with their stalls.

That makes a total of $4,500 for equipment and material.

TELEPHONE AND TELEGRAPH SERVICE.

For telephone and telegraph service we have provided $500. Of course very little telegraphing will be necessary; there might be some incidental telegraphing; most of that will be for telephone service.

Mr. ANDERSON. Do I understand that there is $3,000 for electrical supplies as part of the $4,500?

Mr. MORRILL. That is part of the $4,500; then the $500 for furniture is for special apparatus in the engine room and refrigerating plant, and $3,000 for electrical supplies.

MISCELLANEOUS ITEMS.

Then we have an item of $58,740 for miscellaneous items.

Mr. ANDERSON. What does that include?

Mr. MORRILL. That is divided up among a number of items, freight, express and drayage about $3,000, fuel, $15,000; power and light, $22,000; ammonia, $1,550; calcium chloride, $2,000; ice, $3,000; repairs to machinery and equipment, $4,000. I explained that once before, but I am going clear through all the items of expense now giving the whole thing.

Mr. ANDERSON. You are not going to explain it but once.

Mr. MORRILL. I did not intend to explain it but once, but we have been discussing one item from the whole list. Now I am starting from the beginning and going clear through. Miscellaneous supplies, $7,690 and miscellaneous services, $500; that makes a total of $58,740.

I explained awhile ago the item of repairs to machinery and equipment. I can take up with you these other items.

Mr. ANDERSON. It is perfectly useless to go through these items, unless you furnish us a list that we can tell something about. Otherwise, there is no use of our doing it.

Mr. MORRILL. I have taken it from the beginning.

Mr. ANDERSON. I am not going to listen to any more testimony on the basis of a statement that is not furnished to the committee.

Mr. MORRILL. Do you want me to write out a statement and give it to you, or do you want me to tell you what each of these items is for?

Mr. ANDERSON. I want to say right now if there is going to be any more testimony based on statements of this kind, tabulations, that I want the committee furnished with a copy of the tabulation before the testimony commences.

Mr. MORRILL. The items that I have been giving you are included here in the estimate. The only thing that is not included in the estimates is the detail going to make up the total of each item. That is the practice that is followed as to every other appropriation in this book.

Mr. ANDERSON. I can not control the book, but I can control what comes before this committee.

Mr. MORRILL. If you want the detail of each of those items written out, we would be very glad to do it. It was written out here so that we could answer your questions on any items, and it was our hope to be able to explain anything you wanted information about. If you feel that the Center Market requires treatment different from the treatment of other items ——

Mr. ANDERSON. I think it does, because it is a new item which has never come before this committee before; it is a new proposition absolutely, and an entirely new venture on the part of the Government, and I think it does require a very different consideration from items which have been before us 10 or 15, 20 or 30 times.

Mr. MORRILL. Of course, it is to be considered that this is not the first time that this matter has been gone over with an appropriation committee. All of the ground that I am covering now was gone over with the committee which handled the appropriation for this year.

I would be very glad to have this statement written up for your use and turned in to you. There was no reason at all why we should not have done it if we had anticipated——

Mr. TENNY. I would suggest that we prepare those statements. We will probably not be through to-night, and we can take that item up in the morning.

Mr. MORRILL. There will be no trouble about it, because we took up every item to see just what it was for and what it meant. It is a pretty big job.

ENFORCEMENT OF STANDARD CONTAINER ACT.

Mr. ANDERSON. I think we better take it up in the morning. We will now consider the item on page 237, enforcement of the standard container act.

Mr. MORRILL. In the case of the enforcement of the standard container act, as you will see, there is an increase of $500 in the amount that has been asked for. That $500 is to pay for additional travel under the item. There are about 400 factories in the United States that manufacture these containers that are subject to this law. This law covers Climax baskets for grapes and other containers for small fruits, berries, and vegetables. It provides, in the case of Climax baskets, that there shall be three standard Climax baskets of capacity and dimensions stated in the law.

It provides also that as to other containers for small fruits, berries, and vegetables the only standard sizes that will be permissible in interstate commerce are the half pint, the pint, the quart, and the multiples of the quart, dry measure, subject to the tolerances allowable by the Secretary of Agriculture in regulations that have been established by him.

It has been found, as a practical matter, that the way of getting the law observed is at the factory where the containers are manufactured, and that means that the man who has the work to do under this item travels from factory to factory. During the fiscal year 1921 he visited 112 factories in New Jersey, New York, Ohio.

Indiana, Illinois, Iowa, Missouri, Kansas, Kentucky, Georgia, Florida, Colorado, Idaho, Washington, Wisconsin, California, and Texas. These figures cover, as I said, only 112 factories out of 400.

In carrying on this work he must do it largely in an educational way by working with the factories, showing them just what the law requires and what it permits by way of tolerances, and advise them as to the adjustment of their forms and making tests of the various containers that they are manufacturing to see whether they come within the requirements of the law. That means that the tests are usually conducted in the offices in Washington, and while during the entire fiscal year 1921 there were 576 containers tested, during the first six months of this year nearly 800 were tested.

Mr. **BUCHANAN.** How many of the containers you tested were lacking in requirements?

Mr. **MORRILL.** I have not the figures as to the number that were lacking in requirements, but we expect that a large number of the containers were lacking under those conditions, because they submit all doubtful cases, and wherever we find they are lacking we advise the factory the particulars in which they are lacking and, if necessary, give them any advice that they may need to get back within the requirements of the law.

Mr. **BUCHANAN.** The standard basket or container is not a very difficult proposition. Would it not be possible to make up plans and specifications for the standard and send it to these factories, cite the law to them, and tell them we expect them to comply with it, instead of visiting the factory?

Mr. **MORRILL.** As to the Climax basket that is not so much of a problem, because the specifications are set out in the law. But as to the other containers for all kinds of small fruits, berries, and vegetables the only standard established by the law is one of capacity; they can use any type they see fit to use, and any attempt we would make to bring about uniformity would be purely in an advisory way and of course we are always glad to give any help along those lines we can. But we can not enforce the observance of our advice as to the shape or as to dimensions of material.

Mr. **BUCHANAN.** You could not do that any better by visiting the factory.

Mr. **MORRILL.** Yes, we find that we can.

Mr. **BUCHANAN.** And you would save considerable expense.

Mr. **MORRILL.** We find, as a matter of experience, that you can do a lot more with a man, by talking to him and showing him than by writing. They do not always submit their containers to us for test. There are some of them who do it, in fact a good many who do. But there are a lot of them who do not submit their containers, and we find from time to time that there are men who do not even know about the provisions of the law, and perhaps care less about the provisions of the law until they meet the man who has the duty of enforcing it and he tells them what they are required to do.

Mr. **BUCHANAN.** Are there any penalties provided in this for its violation?

Mr. **MORRILL.** Yes, there are small penalties provided for violation of the law.

Mr. **BUCHANAN.** I think when there is a violation of the law if you would proceed to punish the violators for it that that would be educational and prevent future violations.

Mr. **Morrill**. Of course, that is perfectly true, but what we want to do is to get the containers themselves right before they go into interstate commerce. We want to head off the violation of the law, and the way to do that is to get at the place where they are made.

Mr. **Buchanan**. In this instance you are traveling around the country advising a certain class of factories what the container requirements are and the penalty that follows, yet there are other classes who are presumed to know the law and to govern themselves accordingly?

Mr. **Morrill**. We look upon this law as having a more constructive side to it than merely the one of punishing people for doing something wrong.

Mr. **Buchanan**. You are punishing them for not doing right.

Mr. **Morrill**. The consumers and the shippers are entitled to protection as far as they can get it, from the short containers.

Mr. **Magee**. You enforce the act, do you not, that Congress passed?

Mr. **Morrill**. Yes, we do.

Mr. **Magee**. Then why not blame Congress?

Mr. **Morrill**. I am not taking the position that Congress is to blame for anything.

Mr. **Magee**. I would. I would blame them if they passed a law I did not approve of. This act was passed August 31, 1916. I do not just see myself why you should be criticised for enforcing this wonderful act Congress passed some five or six years ago. I do not blame anybody except the men who voted for the act.

Mr. **Morrill**. I did not know the question of anybody being blamed was involved, but the question is involved of trying to get the Interstate Commerce free from short containers and unlawful containers.

Mr. **Buchanan**. My idea was to send to each one of these factories a letter explaining that law, saying that the "containers and the specifications are as follows." The others to be of any shape, providing they conatainted a certain quantity.

Mr. **Morrill**. We have done that. We have sent a copy of the law and regulations and all the information we can give to every factory that we know anything about. But that alone does not secure the enforcement of the law, neither does the catching of a violator and prosecuting him accomplish the purposes of the law fully. There is still that side of the problem of getting the containers started out right from the factory.

Mr. **Wason**. Is any shipper or grower obliged to use these containers in sending his fruit to market?

Mr. **Morrill** He buys his containers from these factories and buys them for whatever purpose he wants to use them, according to whatever plans he wants to make.

Mr. **Buchanan**. It is unlawful to ship in interstate commerce in short containers or containers not according to specifications?

Mr. **Morrill**. That is the understanding; it is the understanding we aim to fix in the mind of everybody who has anything to do with this law.

Mr **Wason**. Suppose some factory owner says he is not going to conform with this law, claiming that his goods are all intrastate merchandise, not to be shipped from one State to another?

Mr. MORRILL. Very frequently containers which are short or odd sizes and do not conform to the law are disposed of within the State, because we find them and they know that we know it, and that therefore they run the risk of being prosecuted if they ship in interstate commerce.

Mr. WASON. Of course, the factory man can not be prosecuted, could he?

Mr. MORRILL. If he shipped them out of the factory?

Mr. WASON. He would be the shipper; he would not be the manufacturer.

Mr. MORRILL. He is not prosecuted as manufacturer, but as a shipper.

Mr. WASON. He is acting in a dual capacity?

Mr. MORRILL. I am not speaking of the shipper of the commodity; I am speaking of the shipper of the basket.

Mr. WASON. He would become a shipper the minute he loaded them on the freight car to go from Texas to Oklahoma, for example?

Mr. BUCHANAN (interposing). Suppose I lived in Oklahoma and he lived in Ohio, and he shipped the baskets to me. Then he would violate the law, because he shipped those baskets in interstate commerce. There is nothing in them; but he shipped the baskets.

Mr. WASON. But if you sold them to somebody in Texas and they took them over the line with a pair of horses or mules?

Mr. MORRILL. I want to make this observation, that it would take a great deal bigger force to inspect the baskets at the markets or in the course of transportation than around at the factories where they are being manufactured.

Mr. WASON. How often do you attempt to visit the factories?

Mr. MORRILL. We have one man visiting the factories, and he visited 112 factories in 1921, and there are 400 factories altogether.

Mr. WASON. When he gets around from visiting all of those 400 factories, how soon will he be starting on the second trip of inspection?

Mr. MORRILL. He would have to keep going, because there is no end of human ingenuity in manufacturing these baskets.

Mr. BUCHANAN. You do not contend that it ought to be the policy of the Government to keep a lot of traveling men going around over the country seeing that citizens comply with the law in regard to making baskets or anything else according to certain plans and specifications?

Mr. MORRILL. What are you going to do when you find baskets in the markets shipped by persons who did not manufacture them and who perhaps did not know they were short?

Mr. BUCHANAN. It is their duty to know.

Mr. MORRILL. It is their duty to know, legally speaking.

Mr. BUCHANAN. Every man is presumed to know the law, and if you prosecute one or two they will come to it; they will have to keep their eyes open and look into these things. Every citizen is charged with knowing those things.

Dr. BALL. That is the same way with a large number of these inspections.

Mr. BUCHANAN. The thing has got no end to it. I would not mind starting them out the first time to see that they got started right, bu to keep the thing going and keep these people on the road all the time is not good policy. The more the Federal Government takes over the more men it will require, and the first thing we know we will be a nation of tax consumers instead of a nation of tax producers.

Mr. **Magee**. We might have some trouble in getting convictions.

Mr. **Buchanan**. We always have trouble getting convictions.

Mr. **Magee**. The way I look at it is, without criticism of anybody, there are so many laws I wonder how people know anything about more than a very small percentage of them.

Dr. **Ball**. It works out that in a number of cases in going to the factory there is opportunity to caution, and then when you get a man who is viciously violating the law you watch him and catch him.

Mr. **Morrill**. As a matter of fact, we find a spirit of willingness on the part of the manufacturer to comply with the law when our man visits them, tests their apparatus, and shows them where they are wrong. We do not find any opposition among the manufacturers, with the possible exception of one or two that we run into.

Mr. **Buchanan**. I do not see why you should.

Mr. **Morrill**. The manufacturers, as a matter of fact, look upon standardization as a good thing, and they desire further standardization as a protection against the demands of their customers, who ask for all sorts, sizes, and shapes and capacities, which makes the cost of operation of the factory much greater, less economical; and yet they have to comply with these demands of their customers because their competitors may do so.

COMPLETION OF WOOL WORK.

Mr. **Anderson**. The next item is on page 238, completion of wool work.

AMOUNT OF EXCESS PROFITS, AMOUNT COLLECTED.

Mr. **Morrill**. To me that completion of the wool work seems to to be a never-ending task, one that we would like very much to get through with, and get done. The situation at the present time is that we have practically completed our field auditing so far as it seems desirable to go, although every bit of field auditing we do discloses additional profits that have been made on the wool in 1918 that had not been shown in the reports; for example, we took $2,500 this past year and sent out auditors, and they found $250,000 of excess profits that had not been disclosed previously. We have gotten down to the point where we have turned over to the solicitor of the department 45 cases, most of which have been sent to the Department of Justice, and the others are on the way. We have actually determined from reports and from audits that there were $1,395,813.34 excess profits on the wool clip of 1918 in the hands of the wool dealers. We have collected of that amount $610,663.14, leaving uncollected $785,150.20. Of that uncollected portion the amount that is involved in the 45 cases that have been referred to the solicitor is $568,000. These figures I am giving you are as of January 5, 1922. Of course, we prepare these figures right along, and there will be changes from time to time. But the general problem is the same, though the figures differ.

Mr. ANDERSON. Are these cases in which the people refused to give up the profits?

Mr. MORRILL. They are. They are cases in which they refused to give up after demand and after every exertion that we could make to induce them or convince them that they should pay the amount of excess profits. In most cases they are following the leadership of a large firm, Brown & Adams, in Boston, who owe something like $268,000, and who contend that they are not legally bound to repay these excess profits to the Government, notwithstanding the fact that they signed an agreement with the War Industries Board, one of the express conditions of which was that they should abide by the regulations of the War Industries Board and those regulations expressly limited their profits, their contention being that the War Industries Board never had any power to make those regulations in the first instance, and they utterly ignore the promise in the meantime.

We have had, so far, I think, only two cases which have actually gone through the courts; one case where a party, after being sued, had admitted liability; and another case where the suit was contested and a decision was handed down by a district court in Michigan; and then, before the time for a trial—I might say that the decision was on a demurrer to the declaration—they admitted liability and paid the amount.

The other cases are awaiting action by the Department of Justice in the way of actual institution of trial, although the proceedings have been started, and it is my understanding that the reason for the delay is on account of the congested dockets in the United States courts where the cases have been instituted.

There are some cases that have not yet been referred to the solicitor in which we are endeavoring to effect settlement before having to take any court action, cases where the parties either contend that our figures are wrong as a result of our audits or where, on account of the difficult situation in the wool industry, they have asked for time in which to make the payments.

Mr. BUCHANAN. How much, approximately, do these men owe?

Mr. MORRILL. The last class of cases I am speaking of $216,000. In other words, we have collected about forty some thousand dollars since the date of this statement. Of the money that we have received, the $610,000 that we have actually collected, we have distributed back to the growers $279,000 in round figures, and we have undistributed in round figures $330,000. That is made up of cases where the total amount due us has not been paid to us, and we are waiting until it is all paid, or where we can not find the man who is entitled to the money, and that will therefore go back into the Treasury of the United States.

Mr. ANDERSON. What remains to be done now so far as the department is concerned in this work?

Mr. MORRILL. In a general way two things remain to be done: The distribution of any collections through the courts, or of funds that are freed from the disagreements that we have, or which are being held from the fact that we have not collected the total amount; and the preparation and presentation of the cases in the United States courts.

Mr. Anderson. Is that done under this item?

Mr. Morrill. Yes; that is done under this item. When I say preparation and presentation I am speaking of the Department of Agriculture, not the expenses of the Department of Justice.

Mr. Anderson. I know, but after the case goes over to the Department of Justice what expenses do you have?

Mr. Morrill. We have this class of expenses: In the first place, our auditor must be used to present the facts disclosed by the audits, as they got them in every case where a contest is made, and we have every reason to believe that every one of these cases will be contested. That means that when the contest arises our auditors must appear in court to present and verify the figures resulting from their audits. That also means every time their traveling expenses and per diem.

Mr. Anderson. You have only got one auditor?

Mr. Morrill. We have only got one auditor now, but we would have to call in the various auditors who had made these audits and use them as witnesses.

Mr. Buchanan. You also have $172,000 to collect that may not be litigated.

Mr. Morrill. That is true. We would hope that all of that would not be litigated; that we would get back some of it without litigation. We can not tell. We have about arrived at the point where we are not making headway without litigation.

DISPOSITION OF MONEY COLLECTED.

Mr. Anderson. No part of this expense of administering is charged against the payments?

Mr. Morrill. No; this is not a revolving fund. The expenses are paid exclusively out of the appropriation. The moneys received are treated as entirely separate funds, and whatever we do not return to the growers goes into the Treasury; absolutely no part of our expenses is paid out of what we collect. Of course, the Treasury is keeping all of these funds segregated from its other receipts.

Mr. Anderson. As trust funds?

Mr. Morrill. Yes. But my statement is correct, that whatever we do not return to the grower goes into the Treasury and stays there.

Then we know by experience with the Department of Justice that we have to assist the Department of Justice in every case of an important character by our own assistance or those of the solicitor.

Mr. Anderson. I know, but that does not come out of this fund, does it?

Mr. Morrill. Yes; the traveling expenses of solicitors has not any other place to come from except the $15,000 appropriated.

Mr. Anderson. Is there not any expense fund in connection with the solicitor's office out of which this could come?

Mr. Morrill. They have no lump fund. Every time they travel it is charged against the appropriation for which they travel. We have to pay whatever expenses they incur in this travel.

Mr. Buchanan. Is anything deducted to repay the Government for the amount used in making this investigation?

Mr. Morrill. The receipts are not used in any way in paying expenses. It is just simply a book calculation you can make if you want to show our receipts.

Mr. Buchanan. Does the Government charge any percentage for collecting this money, or does the owner of the wool get the whole amount collected?

Mr. Morrill. The owner of the wool gets back his share in full of the excess profits of the dealer to whom he sold his wool, without any deduction by the Government of any part of its expenses.

Mr. Buchanan. And this is a voluntary job we are doing for the growers of the wool of this wool clip in order that they might get justice?

Mr. Morrill. Yes; it is voluntary, so far as the individual grower who gets any return from it is concerned. The Government will get a very large amount of money out of it on account of the growers who do not get their refunds because we can not locate them.

Mr. Buchanan. And that will be a trust fund in the Treasury for years, until they come for it.

ENFORCEMENT OF PACKERS AND STOCKYARDS ACT.

Mr. Anderson. You might now take up the packers and stockyards, page 276.

ACTIVITIES COVERED AND RULES GOVERNING THE ENFORCEMENT.

Mr. Morrill. For the remainder of the current fiscal year there was an appropriation of $200,000; for the next fiscal year there is an item of $410,500. At the time we submitted the estimate as a basis for the appropriation for the current fiscal year we figured on a little more as the probable expenditure for a year, and the appropriation which was actually made was $200,000, and was made on August 24. So that the current appropriation is on a basis of much less than $400,000 a year. But there is a good reason for that, of course, in that it could not be expected that the organization would be on a completely organized basis at the end of this fiscal year, and therefore what would be necessary for a full year's work would not be spent in the first year.

The packers and stockyards act applies to all of the slaughterers and packers of meat in interstate commerce. It applies to all of the stockyards of a certain character: that is to say, places commonly known as stockyards that are operated for compensation or profit at public markets, and which have an area, exclusive of runs and alleys and passageways, of 20,000 square feet or more.

In addition, the law applies to every person who buys or sells live stock on a commission basis or on his own account, or as an employee or agent of another, or who renders any sort of service or facility in the yards with respect to interstate commerce.

So far we have found 66 of those stockyards throughout the country that come within the definition of the law. In addition, there are probably more than 3,000 of the various types of persons, market agencies or dealers, who are operating in these yards, more or less in interstate commerce under this law.

There are at least 329 packers—that is to say, all those that are subject to meat inspection law—that are subject to this law, and, in addition, because of the nature of the definition of commerce contained in this law there may be certain other packers who, while not subject to the Federal meat inspection law, would be subject to this law, because it may be that they buy live stock in interstate commerce even though they sell the meat within the same State; there may be some cases of that kind.

The packers and stockyards act provides for the supervision of all of the operations of any packer who comes within the definition of the law, even though his operations go outside of meat packing—that is to say, for example, in order to determine whether he is subject to the law we must first ascertain whether he is engaged in buying live stock and slaughtering it for meat purposes in interstate commerce. Having found that, if he is engaged in any other line of business, that business is subject to the law just the same as is the packing business.

A series of rules of conduct are laid down for the government of the packers. Those rules of conduct cover, perhaps, everything that is covered by the antitrust laws and in more detail, more specifically than in the antitrust laws. I do not know whether the members of the committee are fully familiar with those provisions of the law or not; I do not want to burden you, unless you want me to make some statement along that line.

Mr. **Buchanan.** If you have any copies of those rules, I would like to have you send me one.

Mr. **Morrill.** I would be very glad to furnish every member of the committee a copy of this pamphlet. I have but one copy here.

Mr. **Anderson.** Does it have anything except the law in it?

Mr. **Morrill.** It contains the packers and stockyards act of 1921, the general rules and regulations of the Secretary of Agriculture with respect to stockyard owners, market agencies, and dealers, and extracts from the Federal Trade Commission act. In a general way the provisions with reference to the packers are regulations of the conduct of their business, including the ascertainment of whether they are keeping accounts in such a manner as to disclose the facts of their business. In case it should be discovered that they are not keeping their accounts in such manner as will clearly disclose the facts of their business, then the Secretary of Agriculture can make requirements as to the forms of accounts that they use.

As to the stockyards companies and the market agencies and dealers in the stockyards in a general way these same rules of conduct apply. But specifically control is given over their rates and charges with reference to their reasonableness in very much the same way that control is given in the interstate commerce act over the rates and charges of railroad companies, and in fact the interstate commerce act is referred to for certain purposes connected with the procedure that shall be followed under this law, and the Federal Trade Commission act is referred to for the purpose of procedure in connection with the packers.

Every market agency and dealer who comes within this law must register with the Secretary of Agriculture showing certain facts about the nature of his business, and every market agency that does business on a commission or charge basis must file a schedule of rates and charges; the stockyard companies also must do that within a certain time that is specified.

In order to carry out the provisions of the law, inasmuch as it is a peace-time permanent proposition which needs to be built up constructively, we have had to proceed slowly and with a good deal of care, so that as few mistakes as might reasonably be expected would occur.

Of the 66 yards not all of them are important; many of them are relatively unimportant; they need attention, but not the attention of a man all the time. So that we have estimated that placing men at not more than 30 yards would take care of the entire 65 or more by assigning secondary yards to the districts of the men that are located at the more important yards. The reason for placing men in these yards is that there are many questions of local practice, irregularities, and the like that can only be handled effectively by men on the ground, and it was made clear throughout the consideration of this bill before it was passed that it was expected that some such procedure would be adopted, that many questions that arise in the yards would be handled by the supervisors in an informal local way as far as possible, leaving the question of formal proceedings only to cases of unwillingness to obey the law or to cases that could not be settled except in a formal way.

We have found that as a matter of fact that is the way in which we are going to have to accomplish a good deal of the purposes of the law. In one market the supervisor found they were using these long prods with sharp points on them for prodding the animals around for the purpose of getting the necessary action out of them, and as soon as he observed that practice, saw how it was going, he called it to the attention of the stockyards company and the various commission men that he knew were doing it, and to the fact that they were damaging the animals and the meat by that practice, and they agreed to discontinue and substitute other forms of implements.

In the same way we have found other things: for example, recently one of the auditors in going through the books of the commission firm found that the commission firm was actually insolvent, that it could not pay its shippers if it had to do so at that moment, and he wired the facts to me, and, after receiving my instructions, he went over the situation with the commission man, went to his bank with him, and the band financed him to the extent of about $20,000, which was the amount needed in order to put him in position to settle with his shippers. That was a situation that was not known to the exchange or to anyone else until it was found by the auditor in going over his books.

We have found a good many other things that manifestly needed attention. Quite a good many of them I have noted from time to time as they came up before me. For example, in one of the markets there was the custom on the part of the commission men and the buyers to make an arbitrary deduction of 3 per cent of the weight of every animal for shrinkage, and to pay on the weight less the 3 per cent upon the theory that the animal either had filled or would lose in weight on account of handling and things of that kind. In applying the 3 per cent, as you can see, it took no account of the previous condition of the animal or of its condition after feeding; and when that was taken up by our supervisor with the commission men and dealers they got together and voluntarily agreed to discontinue the whole thing and adopted a rule of the market by which the animals would be paid for on their exact weight.

We found that in a certain market the commission men were paying various forms of gratuities, such as actual rebates, subscriptions to market papers, meals, free telephone and telegraph messages, and the like, to the extent of 25 to 30 per cent of their gross receipts.

Under the packers and stockyards act any form of rebate is prohibited and made unlawful; and, as a matter of fact, it has been looked upon by trade generally as a bad business practice to do anything like that, because it is in effect a discrimination among the different shippers. They do not all get treated alike under a condition of that kind; and it makes the apparent commission charge a fictitious charge, and we have secured the discontinuance of that practice in that market by pointing out its various features and by securing the agreement of the commission men to the rules.

Mr. **Buchanan.** That was a per cent of their commissions?

Mr. **Morrill.** Yes; it amounted to 25 or 30 per cent—it was not figured as per cent.

Mr. **Buchanan.** Of their commissions?

Mr. **Morrill.** Yes; of their commissions. We find that there are a number of other practices about which there are differences of opinion in the commission trade among speculators and exchanges generally: For example, what is called the weighing-up practice; that is to say, I mean by weighing up, where the commission man weighs up the live stock that have been consigned to him for sale to himself and pays the shipper the assumed market value. That is considered contrary to good business standards in a great many markets. In a few markets it is directly prohibited; in others it is not—in a great many others it is not, as a matter of fact; and in many markets it is defended as a market necessity.

In the case of the cooperative commission concerns, they have felt that it was a necessity to establish what they call a stocker and feeder or shipper division, where when they get through the day's sales they take over the remainder of the cattle at what they figure to be the market price and make an immediate account sales to the shipper, and then sell the live stock later, when they get a chance, at a reasonable price; and the cooperatives justify it on the ground that the shipper ultimately gets it all back, because it is on a purely cooperative basis anyhow. It is contended, on the other hand, by old-line commission men that it gives a great deal of opportunity for favoring some shippers and not others. It is a criticism that applies, regardless of whether a cooperative or old-line agency; in other words, where they weigh up, they may fix the price so as to favor one shipper and give him a good, substantial price for his and take it off of some other shipper. So that while the shippers, in the aggregate, get it all back, the individual shipper does not get equal treatment, perhaps. That is a matter that we have all of our supervisors working on, investigating and determining just what is going on, and reporting to us, with the idea that we can establish a general policy of administration.

Some questions arise as to what are called "string sales," where the live stock of several shippers are sold as one lot, and at perhaps a flat price, and then the commission man undertakes to prorate back to the shippers that lump sum according to whatever judgment he may be able to exercise. That is regarded by many people in the trade as a bad practice and one that can not be justified. On the other hand, some of them point out that they can not always make sales to individual buyers unless they do sell several small lots together. That is a doubtful answer, but, nevertheless, it is the answer that is made.

Now, we are working up a sort of a program of these things for all of our supervisors to investigate one after another and make special reports on, so that we can determine what is the application of the law, as to those matters, and what ought to be the practice of the various people in the business, and what should be done, and as fast as we determine upon the attitude we advise our supervisors what they shall do about those things.

Right now we have a matter pending which will proceed to a formal hearing and which will take a considerable amount of testimony, and will require a decision of the Secretary of Agriculture, and that is a complaint filed by the Kansas City Livestock Exchange against Armour & Co. and the Fowler Packing Co., of Kansas City, where it is alleged by the Kansas City Livestock Exchange that the yards operated by the Fowler Packing Co., of Kansas City, the Mistletoe Yards, are being used as a factor in depressing the value of live stock in the public yards of Kansas City, because the Fowler Packing Co. is buying direct from the shippers and on a different basis from that used in the main yards; that is to say, they are paying shippers on the assumed basis of the average value of the hogs, of like grade and character on the same day in the public yards, that fact being determined by the buyers of the Fowler Packing Co. exclusively, the shipper not being present. The respondents justify that on the ground that fill is eliminated; they do not feed the animals; the animals go to slaughter immediately; the yardage charges are eliminated, the heating up of the animals on account of fill and other handling is eliminated, and they make various other justifications of it. So that, in view of the fact that a formal complaint has been filed with us, we will have to carry the matter through.

I have mentioned a number of things about practices. We have the question of costs of marketing live stock in the yards, from the standpoint of economics generally, from the standpoint of the reasonableness of the rates charged, and from the standpoint of a comparison of the efficiency of the old-line commission agencies with cooperative commission agencies, and notwithstanding the pendency of the litigation to test the constitutionality of the packers and stockyards act, and the opposition of a good many of the commission men to the enforcement of that law while that litigation is pending, we have secured a withdrawal of that opposition in respect to the South St. Paul market, where we are making a complete audit of the accounts of the commission men, and later of the stockyards company, for the purpose of getting at all of the items of cost and the relative services rendered so as to determine, as I said, the reasonableness of the rates and also what class of agency is the more efficient in terms of service rendered and charge and cost.

Mr. **Anderson**. Can you exclude one or the other even if you do?

Mr. **Morrill**. I am not proceeding on the theory that we would exclude one or the other. They have both got a right to do business.

so long as they do it legitimately and honestly, and they have a right to an impartial attitude from the packers and stockyards administration, and they will get it. But we think that the people of this country are entitled to know what are the facts about cooperative as distinguished from old-line commission business and both sets of agencies have fully agreed and are assisting us in carrying on this investigation.

Mr. BUCHANAN. On the other hand, the cooperative people are entitled to know all about the old-line stockyards?

Mr. MORRILL. I think the shippers are entitled to know and, as a matter of fact, I have attended some of their meetings, where they are very much in doubt about this whole proposition. They do not know whether they should support these cooperatives or not; they have been told a lot of things about the cooperatives and about the old-line companies; each one asserts certain things about the others, and nobody knows the truth.

Mr. BUCHANAN. Have any people tried to know about both?

Mr. MORRILL. Yes; I do not limit the knowing about it to one class or the other; in fact, I would hope no one would get the impression that we made any distinction between them.

Mr. BUCHANAN. That is the reason I put it in that way.

Mr. MORRILL. Of course, in doing that we are doing it in such a way that not only can we determine the reasonableness of the rates but the information can be used from the standpoints of costs of marketing investigations that have been spoken about here before in the Bureau of Markets and Crop Estimates, carrying the cost of marketing of live stock all the way through from the producer to the consumer; and that is one stage of it. And as we develop our organization and get the right kind of men, we want to follow the thing through the packers, and we should, as a matter of fact, do so because of the great amount of contention that there has been in the past as to what the packers' figures mean. I do not mean to say that there is anything easy about that and I do not promise anything. But I am going to perform the duty that has been imposed on us to the best of my ability.

Mr. ANDERSON. It is very difficult and I shall be interested to see whether it can be done.

Mr. MORRILL. I grant the difficulty of it. We have either got to try or else stay off of it, one or the other; and Congress evidently decided we should try.

There are quite a number of things in the yards requiring study. I have not begun to mention them. They come in to us from the supervisors all the time, and there has been settlement of quite a good many disputes in the yards without the necessity of going any further.

To give you an illustration of the kind of disputes that come up, for instance: In East St. Louis a speculator was driving a lot of hogs through the alleys and at the same time the buyers of one of the packers were driving a lot of hogs through, and they came to a point where there was a junction of the two alleys with a gate between, and in some way or other the gate came open and the two lots of hogs got mixed; and, following the custom of the markets, both lots of hogs were thrown back on the stockyards company on the ground that the stockyards company was negligent in allowing the gates to come open.

Our supervisor went into the matter on the ground, had all the parties in his office, and went over the facts and found that no one except the stockyards company could have been negligent, because it was the duty of the stockyards company to maintain these gates. It was admitted by every one concerned that the gate came open; and upon presentation of the facts to all the parties our supervisor was asked for his opinion as to what the amount of damage was, and he expressed it, and the parties voluntarily agreed to settle that way.

Mr. **Anderson.** Had the hogs been weighed?

Mr. **Morrill.** Yes; they had been weighed.

Mr. **Anderson.** So the liability to the shipper had already been discharged?

Mr. **Morrill.** Oh, yes; the shipper was not involved; it was a question of distributing the dollars between the packer, the speculator, and the stockyards company.

Mr. **Buchanan.** Was not that a question of each man finding and identifying his own hogs?

Mr. **Morrill.** They could not identify the hogs, because they got mixed; and, as I say, they have a custom by which when any lots of live stock get mixed they throw them all in together.

Mr. **Wason.** Suppose the gate had been fastened so that it could not open but was not in very good condition and that the hogs got through the rails and others followed: What would you do in such a case as that?

Mr. **Morrill.** I think that then it would be a matter of the condition of the gate, which it would be the duty of the stockyards company to maintain in good condition, and this law especially provides that the stockyards company shall render reasonable stockyards' services, and therefore they are required to do it.

I have heard a good many statements about this law, about there not being much to it, that it would not accomplish anything. There is not a day goes by that I do not find something in that law that had not entirely impressed itself on my mind before, and a good many other people are finding out likewise. It has got a pretty big job in it for the administration, without asking for any more authority. If we can consider this law the way Congress and the public think that it ought to be administered, we will be doing a pretty big job.

I have mentioned things about live stock; I have also mentioned the yards at Kansas City.

We have in the case of the packers a number of questions which we are attempting to settle in the same informal way, and as to which we have every assurance from the packers involved that they are willing to do everything possible to try to settle, such, for example, as the question of unfair competition involved in the packing and sale by one of the large packers of butter in pound cartons, but which actually contain only 15 ounces. One of the large packers is selling butter that way, changing the label on the carton by stamping over the 1 pound the words "fifteen ounces," and that practice has been objected to on the part of another packer on the ground, in the first place, that it is uneconomical, because it costs just as much to market 15 ounces in a pound carton as to market a pound in a pound carton; in the second place, that it is not fair competition, because there is quite a field for deception of the consumer, and, finally, that the complaining packer must either engage in that business likewise or go out of business of selling butter in the same territory. We have got the matter in shape where we are hoping that we can arrive at a settlement of it.

The CHAIRMAN. You may proceed, Mr. Morrill.

Mr. MORRILL. I was talking last night about a number of things in connection with the work in the stockyards. I mentioned the auditing of the accounts of the commission men, including both the old line and the cooperatives at South St. Paul, to be followed by an audit of the stockyards accounts, for the purpose of laying a basis for determining whether their rates were reasonable, and also for the purpose of comparing relative efficiency and relative costs and relative service.

We had in mind that South St. Paul was a peculiar market and typical of a certain condition, about as typical as any market that we could get. That is to say, we have a medium-sized market, around fourth or fifth, and we have two cooperative commission agencies which are in competition with each other and with the old-line commission agencies.

It has been asserted that there are some practices in the market that are not fair to the shipper or to the buyers, so that we felt that would be a very good market to make an audit. However, we do not feel that that would be sufficient from a general standpoint, to confine ourselves to that particular market.

We do not intend to wait until we have gone through a series of markets to publish the audit of the South St. Paul market, but I do feel that we have got to go to other markets. For example, at Fort Worth there is no exchange organization, because at a time in the past, about 10 years ago, they were enjoined under the State law from having an exchange. Consequently it is an unorganized market. There are no cooperatives there, so that we think that that is a good market to take as another market in our audit work. There are a large number of speculators there. Then I think that some other distinctive market ought to be selected before we get through, but I have not progressed so far in my mind as to selecting the exact market, and I want to get one that is different from either of the two that I have named. For example, some market in the East, where business is done on a percentage basis instead of a flat rate per car. It might be that we would select one of that kind of markets, or we might take a market out on the Pacific coast.

Mr. ANDERSON. I presume there is a wider variation of method in the stockyards of the country as a whole than most of us realize.

Mr. MORRILL. We find a tremendous difference. We find that even men in the business themselves generalize as to conditions in the yards as if they prevailed in all the markets; when, as a matter of fact, I have not found a single proposition that holds good in all the markets of the United States.

For example, Mr. Kay Wood, chairman of the legislative committee of the National Live Stock Exchange, asserted on the floor of a public meeting in Chicago that it was a crime; that it was a fraud on the public and the shippers for a commission man to weigh up live stock to himself, and that every exchange prohibited such practice. As a matter of fact we have got in Pittsburgh that very thing going on, and they are defending it, saying that it is necessary; and they have an exchange there. That is just an illustration. That is only one illustration that I could take. I could take practically any proposition that they put up to me and show you the opposite of what they say is going on everywhere. It is not easy to undertake to say what should be the standard of conduct that should exist everywhere.

LITIGATION ON CONSTITUTIONALITY OF ACT.

In that connection you, of course, have heard something about the litigation involving the constitutionality of the packers and stockyards act. That litigation was instituted on behalf of the commission men of Chicago in one suit, and on behalf of the traders in another suit. It was heard before three judges in Chicago—Judge Landis, Judge FitzHenry, and Judge Evans, the last named being the circuit judge—and in a rather comprehensive opinion, going right straight to the constitutionality of the law, they upheld it without any qualification.

Mr. ANDERSON. I wonder if you could furnish me with a copy of that decision?

Mr. MORRILL. Yes; I will be very glad to do so. I have had quite a number of copies made, and I will see that you get one.

They denied the application for a temporary restraining order and an appeal was taken direct to the Supreme Court of the United States, which will be argued on March 20, I think.

In the meantime counsel for the complainants went to the Solicitor General and got a stipulation agreeing not to prosecute any of the appellants for violations of the law between the time of the passage of the law and 10 days after the argument in the Supreme Court of the United States. That, however, applies only to the appellants, and those are persons who, in the Chicago market, were complainants in the case. It does not apply to any other market: but we have had an extremely embarrassing condition to deal with as a result of that stipulation, because the firm representing the traders, of which Mr. Mayer, of Chicago, is a member, has sent out wires that I know of, and I think letters also, advising traders all over the United States that they do not have to comply with this law, and that they had an agreement with the Government that the law is not going to be enforced. Those wires, at least, and those letters simply did not state the truth. There is not any agreement except in Chicago, and I have finally secured Mr. Mayer's admission that what his firm did was not the truth in the matter, and he says that he was not aware of what was going on in his own firm.

I thought I should make that statement because of the fact that it makes our enforcement of the law very difficult as to the traders of the country, and psychologically it extends itself to the commission men, who, however, have not been so advised by their counsel, but they naturally feel that both cases are one and the same proposition. On the other hand, though, we are finding that there is a gradual breaking down—I might say a rather rapid breaking down of the opposition to the administration of the packers and stockyards act on the part of the commission men, and to a considerable extent even the traders themselves, who are supposed to be supporting the litigation. We are doing that through personal contact with our supervisors in the yards where they can see that the Government men are really trying to do something constructive and getting some results and getting matters settled without too much red tape being involved in it. One of the greatest values that I see in having the supervisors in the markets is the personal contact which enables them to settle disputes and inform people of the rights they have and of the obligations they have and to deal with matters on the ground generally.

I might say in that connection that our supervisors each send in weekly reports to the administration of all of their activities during the preceding week, and at the end of the week I have that report summarized, together with any instructions that I have issued to supervisors, and furnish it to the Secretary, so that we are in constant touch with all of our supervisors.

I think that as time goes on there is going to be a fairly heavy expense for telegraphing in that connection, in order to get prompt action on matters, and in order to cut down as far as possible on that expense of telegraphing and traveling I think it will be necessary for us a little later on to divide the country up into divisions with competent men who have been trained and whom we can rely upon to carry our policies direct to the supervisors without so much communication with Washington.

Mr. ANDERSON. Decentralize it somewhat?

Mr. MORRILL. Decentralize it; yes. We are gradually picking out a man here and there in our organization who shows that he has got the requisite ability to handle that sort of a proposition. That is a matter of development, though, and we can not go too fast with it. We have to be cautious.

We have a situation at East St. Louis that is causing us some concern. Most of the exchanges, if not all of them, have rules in their rule books prohibiting their members from dealing with persons who are not members of the exchange. While, in the inception of that rule, it was probably aimed at persons who were not looked upon as of the highest type, and who would not be acceptable for membership, it has grown to have application specifically to the cooperative commission concerns in the markets, because of the fact that in the interpretation that the exchanges place upon their rules, the cooperative exchanges' rebate, and the exchanges look upon that as a form of competition that they can not meet directly, and they are inclined to enforce their rule that they have had, notwithstanding the fact that now that the Packers and Stockyards Act is in force such a rule can not stand; but that is one of the things that is behind this litigation—one of the reasons for instituting the litigation, because they feel that that rule can not be maintained hereafter.

In East St. Louis there are two or three cooperatives now, and an independent or two, that have started up, and they have all felt more or less this apparent discrimination. It is a little difficult to lay your fingers on it and to point out the actual facts, but still it would seem that there is. So, the matter has gotten to the point where they have demanded a specific investigation and action by the administration, and I have a man now in East St. Louis whose sole duty is to get all the facts on that matter so that we can determine whether to take any action or not.

I might say that even there there is a breaking away from the exchange, in that some of the traders and other members of the exchanges are beginning to cut loose on this proposition of dealing with cooperatives. The packers themselves are not a party to it at all.

Mr. Anderson. Well, they never have been, I think.

Mr. Morrill. Well, I do not know that they ever have been, but recently they have adopted a very, very friendly attitude toward the cooperative associations, and while they do not discriminate in favor of them, they certainly do not discriminate against them, and I think that they have really helped the cooperatives to a considerable extent in a good many of the markets.

Mr. Anderson. I have noticed the same difference of opinion among the members of the exchange as to the policy of the exchange with reference to coöperative organizations.

Mr. Morrill. In fact, members have told me that they did not feel that they should fight cooperatives, except in the business. In other words, that they are willing that the cooperatives shall come into the market and do business on the same terms as anyone else, and they will simply fight them on a purely competitive basis, and I think that represents the attitude of the bulk of the broader minded men; but there are so many of them who feel the danger from that competition, and who feel that they are likely to suffer from it, that they are not willing to take that broad-minded attitude toward it. Of course, you could not seriously criticize a man who feels that his bread and butter depends upon the success of these cooperatives.

There has been a lot of propaganda circulated in connection with the matter for the purpose of showing that the cooperatives can not be successful, or that if they are successful they are doing it by devious means, and, regardless of what one thinks about the probable success of the cooperative movement, the shippers in the country generally are entitled to know the facts one way or the other. I feel that if all that the old-line concerns say about the cooperatives were true, the sooner the shippers know it the better. If, on the other hand, it is not true, the same answer applies—the sooner they know it the better.

Mr. Anderson. It is a very difficult thing to get at, because it is always difficult to tell what would have happened if a man had not taken the pill. And it is difficult to tell what you would have gotten for a carload of steers if somebody else had sold them instead of the fellow that did.

Mr. Morrill. Certainly. When it comes to the question whether the cooperatives are getting better prices for their live stock than the old-line commission concerns, that is a most difficult question, and I don't know whether there will be any satisfactory answer to it.

This sort of a theory was advanced, which we are going to test out for what it is worth—that we might take hogs, handled in the same market through the cooperatives and through the old-line commission concerns over a considerable length of time, and average the weight, average the prices, and see what the result is, on the theory that the general average would be fair in both cases. Now, whether that is true or not I do not undertake to say, but that is the theory that has been advanced, and we are going to give it a test.

Mr. **Anderson.** There has always been some question in Minneapolis in respect to the cooperatives dealing in grain. The old-line people have always claimed that the cooperatives did not get as good prices as the old-line people did, and that what the farmer got in dividends and rebates was more than offset by the smaller price that they received. I don't know whether that can be demonstrated or not. I suspect that if it were demonstrated there would still be a good many people who would not believe the demonstration.

Mr. **Morrill.** I think that is true.

Mr. **Anderson.** And if that were not true, there would be a lot of people who are in business now who would be out of business, probably.

Mr. **Morrill.** We have a problem upon which we are working in several markets, created by action recently taken by the stockyards companies. In the past it has been the custom of a great many stockyards companies to make no charge to speculators where reweighing is involved of the live stock. The live stock having once been weighed and sold by a commission man and having gone to a speculator, the speculator gets a free service.

I think the theory upon which the stockyards companies justified that was that it built up a market and afforded a ready outlet for the live stock that the packers would not take themselves, but I think that the stockyards companies recently decided that, either on the basis of the packers and stockyards act or on some other ground, that that was not exactly fair after all. A number of them have introduced a charge equivalent to one-half of the yardage charge, to be exacted from speculators when live stock is reweighed. But they have introduced some refinements on it. For instance, in one of the big yards that extra charge is not exacted where live stock go out of the market. That promptly brought a kick from one of the local packers, who had bought live stock from a speculator and therefore had the one-half yardage charge incorporated in the price. I think that the stockyards company is ready to concede that there is real discrimination there, and they are trying to work out the problem with our supervisors of how to rectify their charges and avoid discrimination.

Mr. **Anderson.** It is exceedingly complex.

Mr. **Morrill.** Yes. In other words, in a small way, reviewing some of the things I have said, we have all the problems of an Interstate Commerce Commission with respect to rates and charges of stockyards companies and commission men and other agencies, such as serum companies, and the like, that render services in the yards; we have all the problems of a Federal Trade Commission with respect to commercial practices of all of those agencies, and the packers, too, not in the case of packers not confined to meat; we have all the accounting problems that any accounting agency has, first, from the standpoint of auditing the books of the various agencies, and, second, from a constructive standpoint of determining better accounting practices, in order to get the facts; then we have, of course, all of the legal questions that are involved in any of these matters. So that we have a pretty big combination of practical and legal questions in the administration of the packers and stockyards act: I think about as comprehensive, in a relatively small organization. as you can find in the Government.

Perhaps I have not covered the general activities as completely as you would like, and I therefore will be glad if you will ask me any questions that occur to you.

ORGANIZATION.

Mr. **Anderson**. I wish you would give us some idea of how the proposition is organized, the classes of employees, and the salaries which you expect to pay.

Mr. **Morrill**. I will have to do that from the standpoint of an organization in process of making, rather than one in actual existence; bearing in mind that it is a pretty slow job for me to get just the kind of men that I want to keep in the organization with reference to the kind of work they have to do; also that the development of the work indicates some changes that ought to be made in my original plans. But in a tentative way I am working along these lines, aside from the clerical organization, which of course would inhere in any organization.

RATES, CHARGES, AND REGISTRATION SECTIONS.

We have to have a section that will deal with rates, charges, and registrations. In that we have already employed a man who has both economic and legal training, to handle those questions. He will have to be assisted by a competent lawyer, whom I have not yet appointed, for the purpose, but who shall have special training in interstate commerce law and practice and procedure, public utilities law, and so on. I am dealing with the Civil Service Commission in that matter, and I have in view a man who might meet the requirements. I have not interviewed him yet.

In addition I figure on needing another man to do routine work in this connection, with the tabulation of those schedules and the carrying on of correspondence and the examination of registrations and things of that sort.

Mr. **Anderson**. You are talking now about your organization here?

Mr. **Morrill**. The organization here in Washington. I will work clear around the circle before I get through. So far I have figured upon three men in that rate section in Washington. Whether it will need more than that I am not prepared to say, although it looks as if it is going to be a pretty big thing to handle the questions that are beginning to come in pretty fast from every direction, complaints about the cost of feed, complaints about such discriminations as that I mentioned involving the extra charge to speculators; the general complaints about the alleged unreasonably high commission rates and specific complaints about relatively small matters like serum charges, not the charge for the serum itself, but for the vaccination service; also charges for hauling dead animals out of yards, and things of that kind.

Mr. **Anderson**. Now, I take it most of those things would be handled in the first instance by the supervisor at the yard.

Mr. **Morrill**. As far as possible we would hope that the supervisor at the yard would be able to take it up and handle it and dispose of it, but he must do it under general advice from the man whose duty it is to consider these specific questions.

Mr. **Anderson**. I take it that it will take you some time to get enough information to lay out any general administration rules by which the local supervisor can be governed. You have to pursue a general policy on some of these things, I imagine.

Mr. **Morrill**. That is one reason why, as far as possible, we are trying to get the matter settled locally, until we can get these general policies laid down, and as far as we can get local settlement satisfactory to the parties, it relieves us in Washington, until we can get an opportunity to lay down general policies that will govern all over. That is the reason I look upon the establishment of this rate section in Washington as important from the standpoint of the personnel and the work that they must do.

Mr. **Anderson**. Now, that rate section in Washington, will that have to do with everything that pertains to rates, charges, and practices in the stockyards?

Mr. **Morrill**. Rates, charges, and registrations, but not practices. I intend to cover the matter of practices in a separate section, because there is plenty to do handling rates, charges, and registrations, and if those people specialize on it, I believe that they can do much better work, if they specialize on those subjects, and do not have the question of commercial practices to deal with independently, except where those practices involve rates.

Mr. **Anderson**. Well, don't they most always involve rates? That is, in the yards?

Mr. **Morrill**. No, they do not. For instance, this question of weighing up to the commission men; the question of string sales; the question of the abusive treatment of animals; the question of shrinkage; the question of discrimination against cooperatives; all of those things really are separate from rates. About the only example that occurs to me of a practice and a rate being involved together is that question of gratuities. There, of course, you would have a junction of two subjects.

COMMERCIAL PRACTICES SECTION.

Now, for handling the question of commercial practices, I think that we should have a separate section for handling commercial practices, and I have made a start, but only a start. I have only one man in Washington who is working on these matters. Unfortunately he happens to be sick at this time and I am shorthanded. There, I think, is going to be a very heavy burden on the Washington office, as well as upon the supervisors in the various yards, because the supervisors realize quite frequently that the problem of a given commercial practice is broader than their own yard, and that they have to find out from Washington whether that same problem has arisen in other yards, and what the packers and stockyards administration thinks about it.

In order to aid the supervisors, we are requiring the supervisors to exchange their reports with each other; so that every supervisor is informed, so far as we are concerned, of what is going on in all the other yards and what questions are coming up and how they are disposed of. We are trying to get an organization that is in complete touch in all of its parts. However, in order to pass upon these matters, it is going to take a number of men in Washington working on commercial practices, and they will have to specialize to a certain extent. For instance, I think that the time of one or two men will have to be devoted to yard practices. I think the time of one or two men will have to be devoted to packer practices, just from the standpoint of examining the facts and working out policies.

Mr. ANDERSON. You mean the packer practices in the stockyards?

Mr. MORRILL. No; not in the stockyards. I mean outside of the stockyards. The packer practices in the stockyards would relate to the buying and handling of live stock, and would be a part of the general problem of live-stock handling in the yards.

Mr. ANDERSON. Will there be a separation—perhaps I am anticipating you—will there be a separation of administration with respect to the stockyards, including the rates, charges, and registration, and practices, etc., and the violations of the act, or proceedings under the act which relate to the practices of the packers?

Mr. MORRILL. As far as the rates, charges, and registrations are concerned, they will not involve a question of separation, because the packers, as such, do not have rates and charges and do not have to register; but as to the commercial practices, I have not quite been able to decide what is going to be the most practical way of handling that. So far we are handling it all together, because there are certain principles that run through all of them; but at the same time it might develop to a point where, as a matter of organization, it would be wise to separate the commercial practices division into two parts, either under one head, coordinating the two parts, or under two separate divisions. I am a little inclined to doubt the advisability of two divisions—one for handling yard practices, the other for handling packer practices—because I want to be sure that the principles that they apply are coordinated.

I do think, however, that there will have to be, regardless of the question you have asked, specializing done. For example, the question of discrimination in buying prices for butter fat is something entirely outside of the realm of the live-stock man. That is just an illustration of the problem I am considering. Yet, underlying the whole thing, is the general principle of equal treatment for all persons in like circumstances. The same principles of law will govern. It is a question of application.

ACCOUNTING SECTION.

Now, as to the accounting division, that, of course, involves a larger or smaller organization, according to the amount of work that we expect to do, and the rapidity with which we expect to get results, plus our ability to get sufficiently competent men.

The requirements for accountants would not be different particularly, in handling the live-stock questions, from those for handling packer questions, so far as the principles of accounting are concerned; but the detail would be decidedly different. I think, though, that there will be no attempt to divide the accounting division into two parts, but rather to make it perfectly flexible, and to use the men according to the work they have on hand, heading it by one man who will generally direct the whole thing.

At present we have our entire accounting organization, which is very small, in the South St. Paul yard, working there, and in addition the head of our accounting section, Mr. French, is and has been for some time studying the packer accounts. He has gone through all the information that the Federal Trade Commission had, including the reports of the outside accountants who were employed for that purpose, and has also interviewed the chief accountants of some of the big packers for the purpose of getting at just what he will have to face in the way of an examination of their accounts and account statements, and whether uniformity or lack of uniformity is such as to require particular attention.

As a matter of fact, even among the big five packers, there is not uniformity of accounting. They admit it, and they have not been able to reconcile it among themselves, even for the purposes of their own comparisons.

I think that you will remember perhaps in some comparisons that they have attempted to make, they have pointed out in one or two cases they could not compare figures exactly, because of their accounting system.

Mr. **Anderson**. Their cost statements, however, are very much alike.

Mr. **Morrill**. Their cost statements are very much alike, and they have been working toward uniformity in the last couple of years. The Institute of American Meat Packers has been working on a uniform system of accounts, but it has not been adopted yet, as I understand it. They are still working on it, and we feel that we have got to get it on that, so as to be sure that when it comes out and is used, if it is used, that it gets information in a way that we would want to get it if we went into their books to audit them.

Mr. **Anderson**. Is there any danger that in the adoption of the uniform costs and accounting system you would increase the possibility of concerted action and uniform price policies?

Mr. **Morrill**. That is a difficult question to answer. I have been thinking about it. My impression is that it would rather decrease the possibility of concerted action, because as a matter of fact, one of the obstacles that I understand is in the way of uniform accounts now is the fear that one of the competitors might learn too much about the business of the other.

In other words, they will have too many facts. That is one of the difficulties standing in the way right now. Now, whether that difficulty will be wiped out I can not say, but at least men like Wilson, of the head of Wilson & Co., and others, are taking a very broad minded attitude and trying to get things into a better condition of affairs.

The accounting question, I think in order to get proper information as to the livestock market and the costs in the yards, and proper information as to slaughtering, packing, and distributing costs, is going to be a very expensive part of our organization. In the South St. Paul yards now we are employing locally, in addition to four auditors, quite a number of girls, employed locally on a piecework basis at an average earning of around $25 a week for what they are doing, and doing it on a piecework basis we are accomplishing work very much faster than we would on the usual monthly salary basis. We are doing it also without any expense for per diem or traveling by handling it in that way. The only expense for per diem and traveling is that of our regular auditors.

SELECTION OF MEN FOR DIFFERENT SECTIONS.

In that connection there is another side of this that I have been working on. In the selection of men for the different branches of our work, I have tried to take into consideration whether a man who was assigned to a particular work had qualifications which might be utilized in some other branch of the work.

For example, two of our supervisors recently appointed have had very considerable experience in the office accounting work of commission firms, and when I found out that I could do this auditing work at South St. Paul, I took those two supervisors out of their work and put them in South St. Paul temporarily, until we could replace them. That makes our organization more flexible. They will, however, go back to supervision work shortly, because we hope to be able to carry on the auditing work without that necessity.

But you can see the idea that I have in my mind, to try to make the organization sufficiently flexible so that we can direct our energies along any particular line of work at any time with a larger force than would ordinarily be assigned to a particular section.

I might say in this connection that the question of getting auditors is a very difficult one, because the Treasury Department practically is taking every auditor in sight. They are monopolizing the examinations, and we are going to have a hard time getting our men. Our general auditor has been up to the Civil Service Commission and has laid his problems before them. I think it is going to cost us some pretty big salaries to get competent men; $4,000 or $4,500 is probably what we will have to pay for the type of auditors who will be obtained to take charge of a particular job or to deal with the packer accounts.

The packers themselves pay from $10,000 to $15,000 a year for their chief accountants, and that is the type of man we have got to deal with. I think it is of the utmost importance that we select our auditors very carefully, having that in view.

I have mentioned three branches of the work—rates, charges and registrations, commercial practices and the accounting division.

LEGAL SECTION.

Then, there is strictly the legal work, for which there will have to be a division, in which we have already one lawyer, and, as I see it, our legal questions are mounting up so fast that we will have to have three. The time of the lawyer we have now is taken up continuously with the litigation that is now pending in the Supreme

Court of the United States, the litigation which has now been instituted at South St. Paul, the packer consent decree matter, which is pretty nearly closed, but which has taken up a great deal of our time, because he was our representative on that special committee. There are all of these new questions coming up, which require pretty careful investigation and determination. As I said before, we have all the features of the interstate commerce law; unfair competition and unfair practices, and restraint of trade questions, and questions of miscellaneous character coming up all the time.

Then, for the purpose of employing and directing the activities of our supervisors, and our field organizations generally, we have to have someone who can give his whole time to that. I have an assistant, Mr. Bray, who was formerly head of the live stock and meats division of the Bureau of Markets, who is looking after this administrative organization question in the field.

CLERICAL FORCE IN WASHINGTON.

Then, of course, there is the Washington clerical organization, which I am handling as a unit for all of the clerical work of the Washington office. There is quite a good deal of work. We have an immense amount of correspondence. Quite a good deal of typewriting to be done in connection with these registrations, schedules, and rates and charges, and instructions to supervisors; and the miscellaneous question of files and things of that kind that you have to deal with.

Of course, we have to maintain a stenographic reporter. We already have one. We may have to have two. In fact, I know we will have to have two, to take the statements of witnesses in informal investigations, and also to report hearings, such as we are going to have in Kansas City soon on this Mistletoe Yards, which will be very extensive. It is cheaper, however, to employ our own reporter than it is to employ outside help at 25 cents a folio.

Mr. Anderson. How much was carried in the deficiency bill for this item?

Mr. Morrill. $200,000 for the remainder of the year.

PERSONNEL—SALARIES.

(See p. 702.)

Mr. Anderson. Now, will you just give us an idea how this estimate of $410,500 is arrived at?

Mr. Morrill. Now, you have on page 277 the items that are set out here. As to the salary for the administrator in charge, I have nothing to say about that.

Mr. Anderson. The present limitation is $5,000?

Mr. Morrill. The present limitation is $5,000; yes, sir. As to the four assistants to the administrations, I have in mind that general assistant for general administrative purposes; one or two, according to the plan I follow, for the commercial practices; one for the rates, charges, and registrations.

Now, I have provision here for a specialist in market and livestock meats and for three investigators. Those are people who will be used for special investigational work wherever it may be necessary, as distinguished from general supervisional activities of the supervisors; men that can be available for use anywhere, for special investigational work.

Now, as to the district and division assistant supervisors that is to take care of approximately 30 markets. Some of the markets are very large and require more than one man. Where we have a group of smaller markets we might have three or four under one man, but in a market like Chicago we are likely to have need for two or three men to handle such a market, and a number of other markets likewise. So far we have placed men in either 13 or 14 markets, and have 17 markets provided for in our assignments.

PROCEDURE IN HANDLING DISPUTES ON RATES AND PRACTICES.

Mr. **Anderson.** Where you have a question of rates and practices coming up in accordance with the legal procedure described in the law itself and distinguished from adjustments which you make as a matter of conference with the people interested—in those cases your questions of rates and charges come before the local supervisor first.

Mr. **Morrill.** If it involves a formal proceeding, no. If it indicates a possibility of disposing of it informally locally, yes. But where it is going to lead in all likelihood to a formal decision, we think, then, that the rates, charges, and registrations section should handle it from the beginning, in order to be quite sure that there is no flaw in the handling of the matter from beginning to end, and to be sure that the record will hold good in court later on.

Mr. **Anderson.** Isn't it going to be a pretty expensive matter, both from your standpoint and the standpoint of the people that will have to be regulated, if all of these questions have to be determined in Washington?

Mr. **Morrill.** I do not expect to have them come here to testify. I provide here for three examiners, you will notice. My idea would be that the actual hearing would be conducted right at the market where the question arises.

Mr. **Anderson.** That would be done by the examiner, who would simply take the testimony?

Mr. **Morrill.** By the examiner, who would simply take the testimony as the interstate commerce examiners do now. He would of course be trained for that purpose, be qualified to do that, and see that all the facts were brought into the record, and then the record would be reviewed in Washington.

I want to minimize the amount of burden that is placed upon people in the different markets in connection with the determination of these questions. It is going to cost the Government a little more money to do it that way, but, on the other hand, I think that the men in the industry are entitled to some consideration.

Mr. **Anderson.** Well, I think that is inevitably the result of the proposition, because after all when you get right down to fundamentals any proposition which necessitates consideration of the question and all the circumstances in Washington means a denial of justice to people who can not afford to come to Washington to try their cases.

Mr. MORRELL. That is right. There is too much red tape; too much routine; too long a time spent on it, and I want the general theory of the organization to be that we, as far as possible, handle things locally.

FILING OF SCHEDULES OF RATES BY STOCKYARDS COMPANIES AND COMMISSION FIRMS.

Mr. ANDERSON. Let me ask you this question: As I understand it, under this act a stockyards company and a commission firm are required to file their schedules?

Mr. MORRILL. Yes, sir.

Mr. ANDERSON. Now, I suppose that the whole schedule could be brought into question immediately upon the filing of the schedule.

Mr. MORRILL. It could be; yes.

Mr. ANDERSON. And the whole question treating the reasonableness of the rates involved in the schedule could be covered at one time.

Mr. MORRILL. It could be. The law expressly provides that any rate may be brought into question either by complaint by any interested party or by the initiative of the Secretary of Agriculture himself.

Mr. ANDERSON. Does it provide for suspending the schedule at all?

Mr. MORRILL. That authority is given, but it can only be suspended for 30 days, with the privilege of an extension for 30 days, and we would have to be very careful in exercising that privilege, because we would want to be sure that we had enough evidence to decide the case upon in 30 days before we did any suspending. Of course, where a schedule was manifestly contrary to the law in some question of form we would reject it, but that would settle itself, almost.

There is also a provision for giving 10 days' notice in advance of the effective date of the schedules, and that also may be waived by the Secretary of Agriculture in special cases where there is good cause shown.

For example, recently I received a letter from the Portland Union Stock Yards, in which they advised me that they had reduced their charge for corn $5 a ton, effective the day they wrote the letter. As soon as I got it I wrote them and called their attention to the provisions of the law; told them that that sort of thing, while it would be permitted in this particular instance, under the authority of the Secretary of Agriculture, could not be expected to be permitted again; that they would suffer embarrassment if they did not observe the provisions of the law; and upon receipt of my letter they wired me and said they wanted to reduce their corn charges again.

Mr. LEE. What charge was that?

Mr. MORRILL. The charge for corn in the yards at the Portland Union Stock Yards. So I permitted the filing of that reduction, but I told them absolutely they would have to conform hereafter to the law; we could not be establishing precedents of that kind. But that sort of thing is going to happen more or less for some time to come, because there are a lot of these people who do not know what the law provides and are just beginning to realize that they are under supervision, and they will want to do lots of things on short notice or on no notice. We have to exercise a good deal of common sense for the purpose of the administration of the law.

PERSONNEL—SALARIES.

(See p. 699.)

Mr. **Anderson**. All right. Now let us go on with this list. You have under this division and district supervisor one supervisor, of course, in each of these 30 markets?

Mr. **Morrill**. Yes, sir.

Mr. **Anderson**. And in 10 of them you will have assistant supervisors?

Mr. **Morrill**. Yes, sir.

Mr. **Anderson**. Are you going to be able to get this thing started fast enough so that you will require all of these employees at the beginning of the next fiscal year?

Mr. **Morrill**. I think that by the first of the next fiscal year we will do that, because we have 17 actually assigned now. That leaves only 13 to complete.

There is one reservation that I want to make to that and that is that we do not want to go too fast. I would rather delay the whole program of organization a little bit in order to be sure of my man, and therefore I can not say positively that I will have the whole organization on the 1st of July because I find that sometimes it takes me a month or two to get the particular man that I want; sometimes I am considerably disappointed and other times I make progress faster than I expected.

But I think that I should be cautious about it. While I plan to have all 30 markets taken care of by the 1st of July, yet I can not be sure of it.

Another thing, too, I do not know how much you are going to appropriate and, therefore, I am a little bit up in the air as to what I can do by the 1st of July, at this time. In other words, if I went ahead too fast, I might overreach myself and have to retrench.

Mr. **Anderson**. When was this deficiency appropriation made?

Mr. **Morrill**. In August.

Mr. **Anderson**. That covers 10 months, then?

Mr. **Morrill**. Yes; but the slowest part was the first part.

Mr. **Anderson**. I understand.

Mr. **Morrill**. As a matter of fact, on the 1st of February our obligations at that time constituted $100,000 of expenditure to the end of the year, not including any of the new appointments or new traveling, or anything else occurring between the 1st of February and the end of the year. So that I think that by the end of the year we will have used our whole appropriation of $200,000.

Now, the matter of clerks is quite important.

Mr. **Anderson**. Well, let us get through with this other first. General auditor and assistant. That is your force in the audit section?

Mr. **Morrill**. That is the force in the audit section. May I say this, that I think as a practical matter that I have underestimated the salaries—the salaries shown here as to auditors. I have only about seven there, and I am going to have to draw on the contingent fund that I have provided down here, or in some other way in the organization, in order to maintain an adequate auditing division.

Mr. **Anderson**. The examiners will be the people who will conduct these hearings?

Mr. **Morrill**. They will be the ones to conduct the hearings out in the field. I have only provided for three and I hope I can get along with that.

Mr. **Anderson**. You have three attorneys also?

Mr. **Morrill**. Yes, sir.

Mr. **Anderson**. Will those all be in the legal division?

Mr. **Morrill**. Those three attorneys will be here in Washington. Of course, they will have to travel more or less.

Mr. **Anderson**. Of course, your stenographic reporters, I take it, are reporters of the hearings held by the examiners, are they?

Mr. **Morrill**. Yes; hearings such as we will have from time to time, including changes in the rules and regulations.

Mr. **Anderson**. Fourteen clerks.

Mr. **Morrill**. That is the Washington office; 36 clerks, you see there, are field clerks, and that is to provide for the clerks in the supervision offices.

You see, in order for the supervisors to perform their local duties, they have to have stenographic clerks to take down the statements of people who come in, and to make the necessary reports to Washington and to the other supervisors; and also for use—there I am figuring a little on flexibility—if we should want to conduct a particular piece of work in a particular market, we might want to move some clerks around in order to do it.

CONTINGENT FUND.

Mr. **Anderson**. Of course, as to these other items of expenditure, you have no experience on which you can arrive at that?

Mr. **Morrill**. Not much; but yet I can already see where it is tending. Of course, I can only guess at it, but experience so far gives us an indication. As I said before, this $20,000 contingent fund that I ask here was primarily with reference to the possibilities of auditing, and I think it is demonstrated already that it will all have to go to audit; not as a contingent fund but as a regular thing. That is $20,000, plus the seven salaries, we have to pay. That will be for paying auditors and these girls who draw off account sales and other things in a routine way.

Mr. **Anderson**. Of course, there is always an enormous amount of purely clerical and tabulation work in connection with any audit proposition. It can not be avoided. It runs into money terrifically.

Mr. **Morrill**. Yes; and what I said before, though, holds good, that as to local audit we want to employ people locally on a temporary basis, so as to cut out the per diem and traveling in those cases. Whenever we can use the ordinary clerical type of person we will do that.

TRAVELING EXPENSES.

Mr. **Anderson**. That can be done on machine work and ordinary tabulations and things like that.

Mr. **Morrill**. Yes. Now the traveling expense, $25,000, as I have said. I have already got a line on that, and I know that that is not going to be excessive. In other words, it is going to be pretty hard work to keep it down to that, because I have been trying to figure on a sort of tentative allotment, and when I allot it out I find I have got painfully little for each particular line of work.

EQUIPMENT AND MATERIAL.

Equipment and material, the item of $12,000 for equipment and material—as you know, while we have to use office supplies, material, and furniture and things like that, that are already in the hands of the Government, this appropriation has to pay for it as a bookkeeping matter; so that while the Government may not actually pay out the cash, you have to provide for it in this appropriation. We are finding that is a very heavy charge. In other words, as nearly as I can tell, they charge us the war-time cost of the material with perhaps a 10 per cent reduction in many cases; 10 or 15 per cent. I am beginning to think that it is costing us more that way than if we would go out in the open market and buy our supplies.

Mr. **Anderson.** I think that is probably true, except for the fact that the Government bought it and it has got to be used in some way.

Mr. **Morrill.** Yes. I am not criticising, but I am pointing out what it means in bookkeeping.

Mr. **Anderson.** From the standpoint of what it costs the departments, I imagine there is no saving at all. As a matter of fact, with the present reduction in prices, the probabilities are that as far as the expenditure from your appropriation is concerned, you probably could get it for less money than you could in buying it from the Government.

Mr. **Lee.** Haven't they sold thousands of desks and chairs at a much lower rate than this?

Mr. **Morrill.** Well, I do not know.

Mr. **Lee.** Cost and 10 per cent off?

Mr. **Morrill.** Nearly all of ours are 10 or 15 per cent off.

Mr. **Anderson.** Maybe you do not know about this, but I am told by the clerk that hereafter the general supply company is going to furnish this stuff at 10 per cent less than the market price.

Mr. **Morrill.** Well, I am glad to hear it. That helps some.

I want to say in this connection, I very heartily approve the policy of using up all this old stuff that the Government has. I think it would be a mistake not to do it, but our head clerk, I verily believe, spends half of his time going around and hunting up this stuff. In other words, we can say that $1,200 a year is spent on hunting up this stuff to serve our needs. That means an added cost in our clerical organization. It is simply a fact that we have got to face. There is no criticism involved, but it is there.

TELEPHONE AND TELEGRAPH SERVICE.

As to telephone and telegraph service, the satisfaction with which this administration performs depends upon the speed with which it operates, consistent with sound judgment. The necessity for using the telegraph is going to be very great. It is already very great. As far as possibe, we use the leased wires of the Bureau of Markets, but they are just about loaded up, and lots of times we can not use them, because they are already in use, or the end of the day has come.

We work after some of the leased wires are closed, so that we have to use the commercial wires. With 30 markets going, with accounting forces in the different markets, with our relations with the packers and various commission agencies and dealers and stockyard companies, we will have to do a great deal of telegraphing.

Of course, that charge for telegraph and telephone includes a telephone in every local office, and in some places the charges for those telephones are pretty high.

RENT OUTSIDE DISTRICT OF COLUMBIA.

As to rent in the field, wherever possible we get an office right in the stockyards, and that happens also to be the cheapest place, as a rule, much cheaper than up town, but even there it mounts up pretty high in some places. In some places we will have to have larger offices than would be necessary simply for the supervisors. For example, in Chicago we have to have a place there to serve as headquarters for any work that we do in the field. The same way in some of the other markets.

STATIONERY AND PRINTING.

I omitted to mention the stationery and printing, but I think it goes without saying that the expense will be pretty heavy. The forms of reports that the commission men make—they make a report to us quarterly—and the ordinary supplies of letterheads and other things that we use. It is evident to me that $7,500, in the long run, is about what we will have to spend.

Mr. ANDERSON. Are there any questions on this matter?

Mr. WASON. In your traveling expenses, you spoke about having got a line on that. In estimating for 1923 did you take into consideration the reduced rate on passenger fares?

Mr. MORRILL. We haven't any reduced rate, because only the tax is taken off; but we never paid the tax.

Mr. WASON. Well, isn't there a reduction in passenger fares?

Mr. MORRILL. Not so far. I haven't heard anything of it. I would like to see it. I haven't heard of it yet.

Mr. WASON. There certainly is.

Mr. MORRILL. They have taken off the tax. That is a reduction to you or me in our personal capacities. That is a saving. That is a reduction, as a matter of fact, but not to the Government. That is not to the Department of Agriculture. It is not a reduction.

Mr. WASON. The department employees travel on tax-free certificates?

Mr. MORRILL. Yes; on transportation requests, we call them. They do not involve the payment of any cash by the employee, and upon which no tax is imposed.

CENTER MARKET, DISTRICT OF COLUMBIA.

Mr. ANDERSON. If there is nothing further on this item, perhaps we had better come back to the central market, page 274.

STATEMENT SHOWING ESTIMATED PERSONNEL, OPERATIONS, AND EXPENDITURES FOR 1923.

Mr. **Morrill**. Now, this statement puts before you the items as shown in the estimates, with the detail of each item in order.

Mr. **Anderson**. That will be inserted in the record.

Memorandum Concerning Estimate for the Operation of Center Market During Fiscal Year 1923.

The estimates show the following major objects of expenditure:

Salaries and wages	$74,443
Stationery	2,000
Traveling expenses	500
Equipment and material	4,500
Telephone and telegraph	500
Miscellaneous items	58,740
Advance charges, claims, etc	15,000
Repairs, maintenance, and improvements of buildings	20,000
Total	175,683

The item of $74,443, listed above, is made up of the following estimated expenditures which are compared with the expenses of the Washington Market Co. for salaries and wages:

PERSONNEL, ADMINISTRATIVE.

Item.	Cost to market company.	Item.	Estimated cost to bureau.
General manager	$7,500.00	Superintendent (this position abolished.)	$4,500.00
Treasurer	2,400.00		
Superintendent	3,600.00	Assistant superintendent (this position abolished.)	3,000.00
Consulting engineer	4,800.00		
Chief engineer	3,120.00	Chief engineer	3,120.00
Auditor	2,750.00	Administrative assistant	2,740.00
Cashier accountant	2,750.00	Accountant	2,200.00
Bookkeeper	2,200.00	Administrative assistant	2,000.00
Clerk-stenographer	1,320.00	Clerk-stenographer	1,400.00
Warehouse foreman	2,400.00	Warehouse foreman	2,400.00
Head receiving clerk	2,100.00	Head receiving clerk	2,100.00
Assistant receiving clerk	1,620.00	Assistant receiving clerk	1,620.00
Night receiving clerk	1,200.00	Night receiving clerk	1,200.00
Elevator operator-janitor	1,248.00	Skilled laborer	1,200.00
		Clerk, first grade	1,200.00
Total	39,008.00		28,680.00

PERSONNEL, ENGINE AND BOILER ROOMS.

3 engineers ($2,184)	$6,552.00	3 engineers ($2,160)	$6,480.00
Engineer's helper	1,500.00	Engineer's helper	1,500.00
3 firemen ($1,638)	4,914.00	3 firemen ($1,620)	4,860.00
Total	12,966.00		12,840.00

PERSONNEL, REPAIR SHOP.

Tinner (55 cents per hour)	$1,673.00	Tinner	$1,680.00
Pipe fitter (90 cents per hour)	2,281.76	Pipe fitter-machinist	2,280.00
Helper (30 cents per hour)	912.60	Helper	900.00
Carpenter (75 cents per hour)	1,760.00	Carpenter	1,740.00
3 laborers (40 cents per hour)	3,650.40	3 laborers ($1,200)	3,600.00
Painter (62½ cents per hour)	1,800.00	Painter	1,800.00
Total	12,077.76		12,000.00

PERSONNEL, COLD-STORAGE PLANT.

Item.	Cost to market company.	Item.	Estimated cost to bureau.
Foreman of porters	$1,304.00	Porter foreman	$1,320.00
5 porters ($1,248)	6,240.00	5 porters ($1,200)	6,000.00
Elevator operator	1,248.00	Skilled laborer	1,200.00
Total	8,792.00		8,520.00

PERSONNEL, MARKET.

Head watchman	$1,040.00	Head watchman	$1,000.00
Watchman	884.00	6 watchmen ($900)	5,400.00
Do	936.00	Skilled laborer	1,000.00
Do	832.00	4 laborers ($840)	3,360.00
Chief sweeper	1,040.00	Laborer	840.00
4 sweepers ($884)	3,536.00	do	660.00
Rest-room attendant	858.00	Part-time laborer	143.00
Do	624.00		
Part-time attendant	143.00		
Total	9,893.00		12,403.00
Grand total	82,736.76		74,443.00

Stationery.—The item of $2,000 for stationery is somewhat of an arbitrary estimate. It was not possible to obtain accurate costs for this item from the market company. There will be a large expense for bookkeeping and stockkeeping forms, the printing of large quantities of billing forms, receipt forms, lease forms, etc.

Travel.—Five hundred dollars is requested for travel, to enable the superintendent to attend public gatherings or make trips to study methods of operating similar plants in other cities.

Equipment and material.—The $4,500 estimated under this heading was made up of the following items: Furniture, $500; $1,000 for special apparatus in connection with the engine room to conduct studies relative to costs of refrigeration according to a commodity basis. Without such information the determination of cold-storage rates upon a basis of cost will not be possible. The remainder of this item—$3,000—is for electrical supplies. The cost of electrical supplies will vary from year to year. It includes lamp replacements, rewiring, additional wiring, purchase of repairs, and other incidental and miscellaneous materials of a similar nature required in a plant of this size and character. Some of these expenses may be charged to the tenants, and therefore does not represent an actual charge against the Treasury, although charged against this appropriation.

Telephone and telegraph.—This item of $500 provides for telephone service within and without the plant. Very little telegraphing will be necessary.

Miscellaneous items.—The total of $58,740 shown under this heading is made up of the following items:

Freight, express, and drayage	$3,000
Fuel	15,000
Power and light	22,000
Ammonia	1,550
Calcium chloride	2,000
Ice	3,000
Repairs to machinery and equipment	4,000
Miscellaneous supplies	7,690
Miscellaneous services	500
Total	58,740

The following explanation is given of the above items, listed under "Miscellaneous items" in the estimates, and which make up the total of $58,740:

Freight, express, and drayage.—The $3,000 is to cover the cost of hauling away trash and garbage. This work is now done under contract by the market company.

Fuel.—This item covers the cost of coal. The usual procedure is to operate this plant by steam from October 1 to March 31 and by electric power from April 1 to October 1.

Power and light.—This item is made up of an expense of about $14,000 for the cost of power to operate the plant for six months and about $8,000 for light. The expense for power represents an actual cost against the Treasury, but the greater part of the estimated cost for light will be returned to the Government by the tenants. The only cost for lighting to the Government will be that for operating lights, for which the tenants are not charged.

Ammonia.—According to figures received from the market company, it cost last year $1,534.64 for ammonia. The Government can not operate the plant for a less amount.

Calcium chloride.—The amount requested is practically the same as that expended last year by the market company.

Ice.—This item is to cover purchases of ice during the summer months, when the demand for ice exceeds the capacity of the plant. This ice is sold chiefly to tenants of the market, and is necessary to the convenience of the tenants and the efficient operation of the market. Practically the entire amount will be returned to the Treasury in the form of receipts from the tenants.

Repairs to machinery and equipment.—It was not possible to secure an exact statement of the repairs to machinery made by the market company last year. It varies, of course, from year to year. We believe the amount requested is conservative. It may be necessary at any time during the course of the year to make emergency repairs due to accidents or extraordinary replacements. In a plant of this size and character costly repairs may be needed at any time. The wear and tear and the susceptibility of accidents to machinery of this character makes it necessary to have a fairly liberal repair item. Modern engineers are setting aside 10 per cent depreciation annually on machinery of this kind.

Miscellaneous supplies.—This item covers a large number of miscellaneous expenses which were not segregated by the market company and therefore can not be explained in detail. The item covers such expenses as $575 for lubricating oil, $140 for waste, $50 for sawdust, $300 for paint, $125 for small tools, and $6,500 for miscellaneous items.

Miscellaneous services.—A small amount has been requested under this heading to cover various miscellaneous services which may be required.

Advanced charges.—The $15,000 shown under this heading does not represent a direct levy against the Treasury, but is a credit set up chiefly for the payment of advanced charges for freight, express, and drayage on shipments accepted for storage by the Government. The advance payment of freight on consignments to storage by the storage house is in accordance with established business procedure, and if the Government is to operate the storage house in this plant it must render the same service if the income from the plant is not to be reduced by loss of business. Payments from this fund are to be reimbursable to this fund within the year.

Repairs, maintenance, and improvement of buildings.—The $20,000 requested under this heading is to make necessary repairs to the buildings and in the market. This building has not received the best of treatment, is old, and many of its features obsolete. The principal items of expense making up the estimate of $20,000 are painting the interior of the building, which includes the high court or areaway in the center of the market place. The condition of the walls is bad and insanitary. It will probably cost us about $13,000 to do this painting. The remainder of the item is for renovating and rearranging the second floor of the Ninth Street wing as offices or an assembly hall, and for miscellaneous improvements in the way of replacement of worn-out insulation in the cold-storage room and general repairs on the various buildings incident to the general upkeep of the plant, and which can not be enumerated in advance of actual operation.

MODIFICATIONS AND USES OF SECOND FLOOR.

Mr. **Anderson.** I wish you would just explain roughly and more concretely what you have in mind with regard to modifications of the second story there.

Mr. **Morrill.** We have in mind only one possibility in that connection, as a real modification, and that is the question of the auditorium or its division into offices. The Secretary, ever since this law was passed, has expressed the opinion repeatedly that there should be an auditorium there so that when he wants to meet the employees of the department he can do so readily. That, of course, would not deprive us entirely of the revenue from that auditorium, because, if it is made into an auditorium instead of offices, we could proceed to rent out the auditorium in just the same way that is done now by a private concessionaire, who rents it out for all sorts of things—meetings or gatherings of various kinds. If, on the other hand, it is changed into offices, then I think that in all probability the offices would be used for the Department of Agriculture purposes.

Mr. **Anderson.** Would that enable you to reduce your rent anywhere else?

Mr. **Morrill.** I doubt whether that would enable us to reduce our rent anywhere else for the reason that such things as the packers and stockyards administration and the futures' trading act would offset any saving.

Mr. **Anderson.** There is no provision in the appropriation for the administration of the stockyards act and the grain futures' act for rent in the District of Columbia?

Mr. **Morrill.** Not in the District of Columbia; no, sir. That is expressly excluded. I do not think that there will be any saving in the total rent of the department by reason of using any offices in the market building.

REPAIRS TO MACHINERY AND EQUIPMENT.

Mr. **Anderson.** Is it possible that these repairs to machinery and equipment, particularly the refrigerating plant, would reduce your coal requirements any?

Mr. **Morrell.** That would be apparently the theory of the engineer, who appeared before the award commission, that that is the cause of increased coal consumption. I can not say whether the amount of repairs that we can do would actually reduce the coal consumption or not—that is, to an extent that would be a material help.

ICE PLANT AND PURCHASE OF ICE.

Mr. **Lee.** Have you an ice plant?

Mr. **Morrill.** Yes; 20 tons daily.

Mr. **Lee.** How much do you use there daily?

Mr. **Morrill.** In the summer time the ice plant is not large enough to take care of the demands, and we have an item of $3,000 in there to purchase ice so that all the tenants can be supplied daily.

Mr. **Anderson.** That is a reimbursable item, then?

Mr. **Morrill.** Yes.

Mr. **Anderson.** Both as to this $10,000 and this $3,000?

Mr. **Morrill.** Yes, sir. The tenants pay for it.

Mr. **Lee.** I think you could make it much cheaper than you could buy it.

Mr. **Morrill.** Oh, yes.

Mr. **Wason.** Do you know what they charge for ice to the tenants?

Mr. **Morrill.** No; I do not. But they do not make a lot of profit on it. Their ice will be about the same as any other manufacturer in the District, in competition with them.

Mr. **Lee.** You never figured what it would cost to make the ice?

Mr. **Morrill.** No; I haven't figured that. There are a good many things of that kind that I have not been able to work out from their books. They are not kept in such shape as to give us the details of cost—that is, the real details. They just give the items of cost.

Mr. **Lee.** I have understood there is great profit in it.

Mr. **Morrill.** That is according to your viewpoint. There is a large profit in terms of dollars; seventy, or eighty, or ninety thousand dollars a year, but when you undertake to allot that to interest, depreciation, and obsolescence, and things like that, I am not sure that there is a large profit. That, of course, will depend upon what is considered to be the real value of that property.

Mr. **Lee.** At this place you would have no delivery charge or things like that?

Mr. **Morrill.** You mean for the delivery of ice?

Mr. **Lee.** Yes.

Mr. **Morrill.** No. That is just within the market.

Mr. **Anderson.** Your prices reflect that fact, too.

Mr. **Morrill.** Yes. We think that in the operation of this market that there is considerable opportunity for the testing of costs and efficiency of such markets, not for socialistic reasons, but for business purposes, in order to ascertain how well a market can be operated on a business basis.

Mr. **Wason.** Whether it is successful or not would not prohibit the socialists from talking about the efficiency of it?

Mr. **Morrill.** I don't know whether they will or not. It depends upon the results. They might not be willing to talk about it at all after they get the results.

POWER, LIGHT, AND HEAT.

Mr. **Anderson.** This item of $22,000 for power and light—if you have your own power plant for the refrigeration, what do you use power for; electric current power?

Mr. **Kitchin.** That plant is run by steam during the wintertime, and that covers the coal charge. During the summer months they run it by electricity, and the electric power is furnished by the Potomac Electric Power Co. They do not generate their own power.

Mr. **Anderson.** I suppose the electric power is used where you do not use the exhaust for heating purposes?

Mr. **Kitchin.** Yes, sir. In the wintertime they want the steam for heating as well as for running the machinery.

Mr. **Morrill.** I am told that they operate the steam plant about six months out of each year.

Mr. **Anderson.** That would mean a total cost for heat, light, and power of approximately $37,000 for the entire plant?

Mr. **Kitchin.** Yes. That $22,000 is divided up into about $14,000 for power and $8,000 for light. Practically all of the $8,000 for light will come back to the Government from the tenants. They are charged for their light.

CONTROL OF PRICES.

Mr. **Anderson**. You do not control in any way the prices and business practices of tenants in the markets, do you?

Mr. **Morrill**. Yes; the law contains a paragraph which in effect is that the right of every tenant to remain on the property is at the will of the Government and that his tenancy may be terminated at any time upon a showing of—I believe the term is "unconscionable practices"—it is something like that—or "exorbitant profits." Things like that, in other words.

The law says that if at any time the Secretary of Agriculture or his successor in charge of said reservation should become satisfied that any lessee on said reservation, or any part thereof, or any person having property stored thereon, is guilty of overcharging, extortion, profiteering, or making an unconscionable bargain or sale, he is hereby empowered and directed to cause such person, together with his goods and wares, to be ejected therefrom, and, further, forever afterwards denied the privilege of trading or being employed therein in any capacity whatever.

The right or authority of the Secretary of Agriculture, or his successor in control of said reservation, to summarily and forthwith eject therefrom, as aforesaid, and to cancel the lease or contract of storage, either or both, without recourse to any judicial tribunal, for any person so offending, is hereby made specific and mandatory. And no contract of lease or for storage shall be made or entered into by the said Secretary, or his successor, without such a provision being incorporated therein, and agreed to by the lessee or bailor. If any such offending lessee or bailor be a firm, joint stock company, copartnership, or corporation, no member of, or stockholder in, any such concern, shall be permitted thereafter to trade in said reservation or to store any article of merchandise or commerce therein.

That is the condition of affairs that is covered by the law, and that means the superintendent of the market will have more or less dealings with the public.

BONUS TO EMPLOYEES.

Yesterday, Mr. Chairman, you raised a question about that bonus.

Mr. **Anderson**. Yes.

Mr. **Morrill**. As a matter of fact, in the preparation of these estimates, it was not expected that a bonus would be paid. We were thinking at that time that in all probability the bonus would go to the end of this year, and in any event, the salaries stated here were to be all the men should receive. Putting it strictly on a comparable basis with the old employees, some of whom we think should be continued in the market under the Government.

Mr. **Anderson**. Well, would there be any objection, if that is the case, to putting in a provision in connection with this appropriation, that it shall not be applicable to the employees provided for here?

Mr. **Morrill**. None at all, from our standpoint.

Mr. **Anderson**. These are not statutory salaries, in any event?

Mr. **Morrill**. No, sir.

Mr. **Anderson**. Of course, they would be under the control of the Secretary or whoever administers this, anyway.

Mr. Morrill. Perhaps you are right about the way it should be handled.

Mr. Anderson. The proposition is just this, that if the Secretary establishes these salaries, as he probably will, and before the first of next year we pass the bonus provision, between now and the first of next year it would not make much difference what the Secretary thinks after that; the bonus is paid.

Mr. Morrill. I agree with you that as far as we are concerned we do not contemplate the bonus should be paid to these employees. There is no question about that.

Mr. Wason. The old legislative bill, if you will remember, excluded the bonus applying to a number of departments, so that it is a common thing.

Mr. Morrill. Yes.

Mr. Anderson. There is no precedent in it, because there are a number of organizations now.

Mr. Morrill. Then my suggestion has no point to it at all.

Mr. Anderson. Of course, that was the result of the fact that some of these organizations were created just as this one is, after the bonus provision was made, and in fixing these salaries they were fixed on the basis of what ought to be paid, whereas the bonus was intended to apply to salaries which had previously been fixed, and there was no provision for raising them at all. Are there any further questions on this market item? If not, I think that we have everything in this statement that we need.

Mr. Morrill. I think the language is identical with that carried in the deficiency appropriation, with one clause at the end cut out.

Mr. Kitchin. In the deficiency it gave us authority to employ the present employees of the market for six months, and that reference would still stand. That is cut out of this item, but otherwise the language is the same.

Mr. Anderson. I assume that is done because you understood that in the six months' period the people whom you did employ would acquire civil service?

Mr. Kitchin. Yes. Mr. Madden has introduced a bill covering the rates to farmers on B Street.

ENFORCEMENT OF FUTURES TRADING ACT.

Mr. Anderson. Now, you have another item, page 277, enforcement of the Futures Trading Act.

Mr. Morrill. Yes, sir.

Mr. Anderson. I think, perhaps, on this you had better make some statement in general, as to what the law provides. I don't know how the rest of the members of the committee are on this proposition, but I know very little about it.

PROVISIONS OF THE ACT.

Mr. Morrill. I have handed to each of the members of the committee a copy of the law itself, and I will undertake to state in a general way what it does provide for.

This statute is framed on the basis of the taxing power of Congress. and in its operation applies to future trading in grain. It imposes a tax of 20 cents a bushel on the transactions that have heretofore been conducted on future exchanges that are known as privileges, puts and calls, ups and downs, and the like, which are of a purely speculative character and do not involve or contemplate the delivery of grain. That tax of 20 cents is prohibitive in fact, and they have ceased to trade in that class of transactions on the Chicago Board of Trade and other exchanges.

Mr. **Lee.** Isn't it quite difficult to determine whether it is speculation or not?

Mr. **Morrill.** Well, there is no difficulty about these so-called puts and calls, bids and offers, ups and downs, which are simply a means of speculating on the market; on what the market is going to be, because they are conducted separately from the other transactions and not with the same forms, and do not entail the same obligations as on a person who buys or sells.

Mr. **Anderson.** This, however, does not present the whole range of speculative transactions by any means?

Mr. **Morrill.** No. This is just one class of speculative transactions that the tax applies to, without any exceptions.

Mr. **Anderson.** Could you tell us what these bids and offers and privileges are?

Mr. **Morrill.** I have a little difficulty in describing them, but it means simply—in one class of transaction it would be what might be called the purchase of the privilege of calling the other party to the transaction when the market gets to a certain point; if it does get to that point, having a settlement then of the profit or loss in the transaction. That is about as well as I can define it off-hand. It is simply an undertaking on the part of one man who believes that the market is going up or down and the other man who believes the contrary, and which ever way the market goes one man wins or loses.

Mr. **Anderson.** The same as if wheat were a dollar a bushel and I simply make a bet with you that it would not go to a dollar and five cents.

Mr. **Morrill.** Yes.

Mr. **Anderson.** And if it goes to $1.05, I pay you 5 cents?

Mr. **Morrill.** Yes.

Mr. **Anderson.** And if it does not you pay me?

Mr. **Morrill.** That is right. They are conducted in different ways and that is the reason they require these different names; but that is the substance of it.

As an example of ingenuity, however, very shortly after the law became effective on December 24, we got a complaint from the Kansas City Board of Trade that there was a concern called the Investor's Daily Guide that was putting out advertising matter specifically with reference to puts and calls, and the Kansas City Board of Trade thought we ought to do something about that. As a matter of fact, that is in the jurisdiction of the Treasury Department, but they corresponded with us.

We had one of our men in Kansas City call on the concern to find out what they were doing. They told him that they ceased to deal in puts and calls and were now handling transactions called "decline guarantees," I believe it was, which has made it necessary for us to go into the question again to find out whether these decline guarantees are the same thing as puts and calls.

These people who are doing this business contend, however, that it is not the old puts and calls proposition at all. That is still under investigation.

In the regular class of transaction on the exchange, known as purchases and sales for future delivery, those are covered by section 4 of the law, which imposes a tax of 20 cents a bushel, just the same as section 3 does on puts and calls, but provides for exemptions from the imposition of that tax. One of the exemptions is where the seller is, at the time of the making of such contract, the owner of the actual physical property covered thereby, or is the grower thereof, or in case either party to the contract is the owner or renter of the land on which the same is to be grown, or is an association of such owners or growers of grain, or of such owners or renters of land.

But the real exception is the exception in subdivision B, section 4, which exempts from tax all such contracts when made by or through members of boards of trade, that apply for and receive from the Secretary of Agriculture designation as contract markets. In order to get that designation as a contract market, the board of trade must show that it meets and will meet all of the conditions set out in section 5 of the law. There are five of those conditions, some of which are determined at the time of designation, and some of which are a matter of obligation continuing throughout the designation. In fact, all of them are obligations continuing throughout the designation.

CONDITIONS PLACED ON BOARDS OF TRADE.

(See p. 715.)

The first is that the board of trade must be located at a terminal market upon which cash grain is sold in sufficient volume and under such conditions as fairly to reflect the general value of the grain, and the difference in value between the various grades of grain, and having recognized official weighing and inspection service.

Mr. LEE. You permit legitimate hedging, don't you?

AUTHORIZED BOARDS OF TRADE.

Mr. MORRILL. Yes, sir. After stating the particular conditions under which the market may be designated, I will go into that question of just what does happen.

We have received applications and granted designation to 11 boards of trade or chambers of commerce. There are two at Chicago. The Chicago Board of Trade, which is the one almost everybody knows about, and the Chicago Open Board of Trade, which is a much smaller organization, but which operates to some extent as a competitor of the large organization, the difference being primarily that the units of the large board of trade contracts are larger, 5,000 bushels, while the open board of trade units are 1,000 bushels each.

There is the further fact that the big board of trade is the real future exchange, in connection with which there is cash grain trading on the floor, provided for the purpose; whereas the little board of trade is primarily of a speculative character. They, however, say that they have been prevented in the past from establishing a cash grain market in connection with the little board of trade through domination by the big board of trade. Their idea is that under this law they will be relieved from that domination and can actually establish a cash grain floor and handle cash grain on the floor of the little board of trade. They have met all the requirements of the law incident to designation.

Then at Milwaukee we have a board of trade that has received the designation. Also in Duluth, Minneapolis, Kansas City, St. Louis, Toledo, Baltimore, Los Angeles, and San Francisco. Those are the ones that have applied for designation and have received it, on the ground that they provide for trading in grain for future delivery. In each case the market has been determined as meeting the requirements of that subdivision A, with this exception, that in the case of San Francisco we limit the designation to barley, and in the case of Los Angeles we limit the designation to barley, corn, and sorghums, because in our opinion at the present time they do not meet the requirements with reference to the other grains. We have not limited the designation as to any other markets, because they were not proposing to trade in any grains for which there was not sufficient cash market locally.

CONDITIONS PLACED ON BOARDS OF TRADE.

(See p. 714.)

The second condition which any board of trade must meet is that it must provide for the making and filing, either by the different members or by the board itself, of adequate records and reports of their transactions consummated subject to this law, showing all the terms and the price and other information that the Secretary of Agriculture may deem necessary for the purpose of informing himself as to the operations of these exchanges. It is provided in the law that these records shall be accessible to the Secretary of Agriculture or his representative at any time, and the records are required to be kept for three years, minimum, subject to inspection.

Mr. ANDERSON. If the Secretary wants to check up any of these reports, he has the power to go back to the original records for that purpose?

Mr. MORRILL. That is the purpose, and I have no doubt it will be necessary to exercise the power.

The next condition is that the governing board prevents the dissemination by the board, or any member thereof, of false, misleading, or inaccurate reports concerning crop or market information or conditions that affect or tend to affect the price of commodities. That is going to entail upon us pretty close observation of the kind of reports sent out by the members of the boards to the different markets for the purpose of seeing whether they have any foundation in fact or not, or whether they are contrary to authentic information. We have some indications that that is going to be quite a job already, because we have a supervisor at Chicago now who has been following up some of these items that are published in the newspapers circulated around the country, and in one or two cases we find a very radical departure from the known facts.

I may have to digress here in order to follow the thought for a minute. It is going to be necessary for us to adopt very close working relationship between the future trading administration and the Bureau of Markets and Crop Estimates, to get market and crop information so as to put it in the hands of the supervisor the instant it is available, so also that when he gets something that he is in doubt about he can wire either to Washington or any other office where the information is available to get verification or criticism at once with the idea that if any false or misleading information is being sent out he can take it up at once with the exchange and call for action which will either punish the offender or prevent a recurrence, because if in any respect the board fails to continue to meet these conditions its designation may be taken away from it and automatically the 20-cent tax applies.

The next condition is that the governing board provide against the manipulation of prices or the cornering of any grain by the dealers or operators upon such board.

In connection with that particular provision it is going to be very important that we get reports and that we have access to the books of these dealers on the exchange, to know exactly what they are doing. While I have not worked out the details of these reports—that is what we are working on now—it is manifest to us that it is going to require pretty close supervision.

Mr. ANDERSON. These reports, I suppose, will show the volume of trading and the volume of actual deliveries made to people as a result of that?

Mr. MORRILL. Yes; that will be the minimum of the information.

Mr. ANDERSON. It will be pretty hard for anybody to corner a substantial portion of a crop without it being known under those circumstances?

POSSIBILITY OF CORNERING MARKETS.

Mr. MORRILL. Yes; as a matter of fact, a corner may have a much more narrow significance than that. There might be an attempt to corner a local supply temporarily and have a local influence on the price for a short space of time.

At Chicago the capacity of the approved warehouses is very limited. If I remember correctly, it is about 12,000,000 bushels. They have a provision, however, for permitting delivery from cars on track during the last three days of the month, I think it is.

Mr. ANDERSON. I heard an argument some time ago about a possible corner of wheat along in April some time.

Mr. MORRILL. Now, right there is going to be the necessity for having men at the important markets, because statistics do not answer questions of the type involved in these conditions. You can have all the information you want as to the number of purchases, the number of sales, the number of transactions, and it would not tell you who was the actual mover in the market at a given time or what were the actuating causes of that movement. It will therefore be necessary to have a man who is constantly on the floor of a particular exchange getting current information that passes around the floor which is available to anybody; observing the movement of prices up and down, and getting acquainted with the people who operate on the board, seeing who they are and what they are doing, and backing that up with the reports or examinations of their books. Then he will be able to form a judgment as to whether such a thing as we hear of frequently, a bear movement or a bull movement, is actually on foot; whether the volume of transactions is primarily hedging, as it is sometimes said to be, or whether primarily speculation.

You can not draw a close line of demarcation between hedging and speculation. That will never be accurately or easily ascertained, but you can get very close to it by segregating the persons who are not in the grain business from those who are in the grain business first, and second as to those who are in the grain business, seeing whether their transactions on the future exchange bear a reasonable relationship to their cash grain business. You can go that far.

CONDITIONS PLACED ON BOARDS OF TRADE.

Now, the next condition is one requiring the governing board of each such exchange to admit to membership and all the privileges any duly authorized representative of any lawfully formed and conducted cooperative associations of producers having inadequate financial responsibility; with the proviso that no rule of a contract market against rebating commissions shall apply to the distribution of earnings among the bona fide members of any such cooperative association.

That condition is one of the substantial reasons for the testing—aside from the question of reporting—the constitutionality of the futures trading act.

ATTITUDE OF BOARDS OF TRADE TOWARD THE ACT.

For a month or two after the act was passed we did not know what the exchanges were going to do. Finally I called on them to tell us what they were going to do about being designated, and they had a meeting of representatives of the principal exchanges at Chicago, where they thrashed out the question of policy as to whether or not they would comply with this law. A minority interest in the Chicago Board of Trade requested the Chicago Board of Trade to contest the law, but at a meeting of those representatives of the various exchanges they decided as a matter of policy, without regard to whether the law was constitutional or not, that they would comply with it officially; that each exchange would apply for designation and agree to comply with the conditions.

I think that there was an underlying belief that it was no longer profitable to fight legislation, and that they had better take what they had than to run the risk of something more drastic. That is my own opinion. I have not heard that expressed by them, but I have reason to believe that they feel that way.

LEGAL PROCEEDINGS INSTITUTED AGAINST ACT.

The consequence was that the Chicago Board of Trade denied the application of Mr. Hill and his associates, and they immediately brought suit against the Chicago Board of Trade and the

Government to restrain the enforcement of the law and to restrain the board of trade from complying with the law. That also was defeated in the court at Chicago. We secured a dismissal of the suit, and an appeal was taken to the Supreme Court of the United States, and there the court finally issued an order permitting the Chicago Board of Trade to obtain designation as a contract market, but restraining the Secretary of Agriculture from enforcing the requirements as to reports and as to the admission to membership of cooperative associations of producers that rebated their excess earnings on a patronage basis. Those are the two things that we can not enforce against the Chicago Board of Trade at the present time. But, in that connection, at a public meeting at Chicago in November, the president of the board of trade said, speaking officially for the board, that they would admit cooperative associations to membership unless restrained by the courts from doing so.

Upon being questioned by Clifford Thorne, representing the American Farm Bureau Federation, as to whether a cooperative association could secure sufficient sponsors, the president of the board of trade said that he for one would sponsor such application, and he would guarantee to get another, making the two that are required. Every exchange represented at that meeting—there were seven of them—by its official representative stated that it would comply with this law in every respect, including that question of the admission of cooperatives to membership.

Mr. ANDERSON. Do you know that the status of the litigation is in respect to the admission of cooperatives in the Minneapolis board of trade, under the State law?

Mr. MORRILL. I do not know what the present status is under the State law. My impression now is that the proceedings are suspended—probably just simply inactive at the present time.

Mr. ANDERSON. This injunction or restraining order of the Supreme Court, to which you referred in the Chicago case, is effective only pending the final determination of the constitutionality of the act?

Mr. MORRILL. Yes; that is all. If the law should be held to be constitutional, then of course the restraining order would cease to be effective. If on the other hand it is held to be unconstitutional, it may be held unconstitutional either in whole or in part—the specific object of the suit was to have section 5 wiped out. Now, whether the court would go so far as to hold the whole law unconstitutional I can not say. There is a provision for separability in the law, and they might conceivably allow the tax on puts and calls to remain and not the other; or they might strike out the whole law according to the point of view that they take about this whole law, in view of the fact that it is framed under the taxing power. But that, to a certain extent, is delaying our active work in the enforcement of the law, because the case has already been argued in the Supreme Court of the United States and the court has recessed until February 27, and may on that day or any other day decide the case.

The result is that people who are not in the service of the Department of Agriculture are not willing to go to work for us when they know that they may be out of a job in three weeks or a month or more. We have a few people who are working, who can be provided for in other work of the department in case the law is declared unconstitutional, and we are planning our work in such a way that it can be developed immediately.

In other words, we have a civil-service register of eligibles and we have got representatives in the Chicago and Minneapolis markets working on the problem of what the regulations should be—forms and things of that kind. We have a couple of men here in Washington who are studying the relationship between the cash and future prices and the meaning of the contract and things like that, doing all the preparatory work we can to get ahead; meantime handling such matters as this question of dissemination of various reports and other things of that kind that come up in a casual way.

ACTION TAKEN FOR VIOLATIONS OF THE ACT.

The final condition that the board must meet is that it must provide for making effective that kind of an order that we were discussing awhile ago against people who manipulate or attempt to manipulate markets.

Mr. ANDERSON. Is your recourse under this act in all cases against the exchange as an exchange or can you make an order directly against a member of the exchange?

Mr. MORRILL. It is in all cases against the exchange as an exchange, from the standpoint of getting real effective action, but there is authority to act against the individual member who violates any provisions in the way that I have described of issuing an order excluding him from the privileges of trading.

Mr. ANDERSON. As a matter of fact, the action of the exchange, as against the member, is fully as effective, of not more so, than the action that you would take?

Mr. MORRILL. Yes, sir. In other words, we think the most effective action we can take is with the exchange, by bringing to its attention what was done by its members, if any, in violation of the law and pointing out the consequences of not remedying the condition.

Mr. WASON. That will probably mean the expulsion of the member or members, and if they did not punish them they would have a right to revoke their permit?

Mr. MORRILL. Yes, sir.

Mr. WASON. That is, the permit of the board of trade?

Mr. MORRILL. Yes, sir. There are provisions in this law that I have not mentioned with reference to procedure in connection with the designation, but those are the special things.

Now, to get to the matter of trading, if the contract market meets all these conditions that I have described and gets its designation, then trading goes on just exactly as it has in the past. The contract is not changed, except to be sure that it contains the information required. They settle their contracts in the same way that they have in the past. The only questions are those of manipulation, corners, making reports, maintaining a cash market, permitting cooperatives to be admitted to membership, and such things. I think it might be said that the main thing to be accomplished by this law is the collection of the information and making it available in a form that we have not been able to get in the past; the phychological effect of constant supervision over the market and the possibility of stepping in at any time when there is an apparent movement to manipulate the market. We will, through the medium of this act, if it is held to be constitutional, have ability that the Government has never had in the past. Investigations that have heretofore been made, like all others, were bound to be on a purely historical basis. and there are lots and lots of questions that you can ask that will not be answered by the historical information on the exchanges, especially when, as in the past, there have been no adequate records of volume of business. It is purely a guess as to what the volume of business is.

I believe the Federal Trade Commission estimate that on five or six principal exchanges of the country the total volume of business was something like 20,000,000,000 bushels a year, and that five-sixths of that was done on the Chicago Board of Trade; but they arrived at that primarily through an estimate based upon the amount of taxes paid on those transactions on the exchanges. They were not able to get the actual figures. They, of course, could not get any very satisfactory information as to the relation between speculation and hedging and as to how the movements originated. They could not get sufficient information. We think, throught the medium of this law, we can go a long ways toward getting that kind of information that people lack now. A large part of the trouble in the minds of the public is that they do not know what the future exchanges are, what they do, how they do it. Not knowing, and seeing all these statements about the volume of business, and about the way the business is done, they suspect a lot of things about the exchanges which may or may not be true. Lack of information is at the bottom of a good deal of the agitation.

Many exchange members were so shortsighted that they did not see that by opposing a statement of fact regarding the operation of the exchange they were actually creating a prejudice.

Mr. ANDERSON. They were giving ground for the suspicion that existed?

Mr. MORRILL. Yes, sir.

PROPOSED ORGANIZATION—SALARIES.

Mr. ANDERSON. Now, will you give us an idea of how this organization is to operate, as to salaries, and so forth?

Mr. MORRILL. Yes, sir. When we made this estimate we were figuring on only six or seven exchanges being designated. We had been led to believe that the other exchanges would not require designation. We had in view the two boards at Chicago, one each at Milwaukee, Duluth, Minneapolis, Kansas City, St. Louis, and possibly Toledo. Recently we have found it necessary to designate Baltimore, San Francisco, and Los Angeles, which somewhat changes the situation as to how we will administer the law.

In the original plan we had expected that we would have a supervisor at Chicago, one at Minneapolis, and one at Kansas City; with an assistant at Chicago, an assistant at Minneapolis, probably one at Kansas City, and one foot-loose for other work. So that we might handle the two boards at Chicago and the one at Milwaukee under the Chicago supervisor's office; the Milwaukee and Duluth boards under the Milwaukee office, and the Kansas City and St. Louis boards under the Kansas City office. Toledo having now come in, that may have to be also carried under the Chicago office. Los Angeles and San Francisco having come in, they will have to be provided for. Baltimore we can handle from Washington.

There is an important phase of the market at Los Angeles and San Francisco. The volume of future trading is not so large, as we understand it, but it serves to form a basis for prices to the farmers.

Mr. **Anderson**. That is a barley market, I understand.

Mr. **Morrill**. Barley on the San Francisco market, and at Los Angeles it is barley, sorghum and corn.

For that reason we think the designation of those two markets is important for the purpose of seeing that the operations are conducted in such a way as not to work to the disadvantage of the producers in the country, whose prices are made on the basis of those purchases.

There will be, aside from those three supervisors and four assistant supervisors that are estimated for, an examiner for the purpose of hearings that may come from time to time, taking the evidence whenever a formal proceeding is necessary.

Then there is provision for four accountants and statisticians; that is to say, men who will be able to go into the books of any particular dealer and go through them and analyze his operations. They will also serve to compile the reports, tabulate them when they are received, and determine the operations of the exchanges as a whole on the various markets.

In Washington there will be an administrator in charge, who has not yet been selected. I am performing those duties at the present time. There is also an assistant and an economist provided for.

It will require a number of clerks, both in the field offices and in Washington, to do the clerical routine work. We have provided for a chief clerk and 12 clerks for both the field offices and the Washington office combined. As you see, there are four field offices, with not less than one clerk for each office, and perhaps more than one clerk in the Chicago office, and the rest in the Washington office.

A certain amount of travel will be necessary, and a good deal of telegraphing. The telegraph expense will be an important item in accomplishing the purpose we have with reference to market information or crop information.

Mr. **Anderson**. The economist will be located at the Washington office, I suppose?

Mr. **Morrill**. Yes, sir; the economist will be located at the Washington office. The first three named are in the Washington office; the supervisor, and assistant supervisors, and the accountants, and statisticians in the field; the examiner I have not determined yet whether he will be located in Chicago or Washington. The chief clerk will be located in Washington, and the other clerks divided between Washington and the field offices.

Those messengers that you see are for the purpose of gathering the reports, making the rounds of the markets in connection with the reports.

Mr. ANDERSON. Do those reports have to be gathered up by messengers?

Mr. MORRILL. I am taking the view that if they are sent by mail we will not get them until the next day, and might not get them until later. I think the way to get the information is to have a messenger go and get it.

Mr. ANDERSON. Are these daily reports?

Mr. MORRILL. I think they are going to have to be daily reports. In fact, if they are not daily reports I do not see what purpose they will serve except largely for statistical information.

Mr. WASON. In some places you may have more than one report a day.

Mr. MORRILL. I think where that happens we will probably send a man to the office and look at the books.

Mr. ANDERSON. The investigator?

Mr. MORRILL. The investigator.

Mr. WASON. I presume you mean where that continues for some length of time?

Mr. MORRILL. Of course, this is all a little bit in the air. We have not actually got our organization under way, and I am not sure how much we will need to do. We will learn a lot by experience.

Mr. ANDERSON. Will you use the $47,500 in the appropriation before the 1st of July?

Mr. MORRILL. I think not, under present conditions. In fact, I am quite sure we will not use the $47,500 this year, because of the delay the litigation has caused us.

Mr. ANDERSON. Are there any further questions in this item?

Have you anything further, Mr. Morrill?

Mr. MORRILL. No, sir; I have nothing else.

Mr. ANDERSON. I think it is probably too late to start with a new bureau before lunch. We will take a recess until 2 o'clock.

TUESDAY, FEBRUARY 7, 1922.

BUREAU OF PUBLIC ROADS.

STATEMENTS OF MR. THOS. H. MacDONALD, CHIEF, BUREAU OF PUBLIC ROADS, AND MR. S. H. McCRORY, CHIEF, DIVISION OF AGRICULTURAL ENGINEERING.

Mr. ANDERSON. We will now take up the Bureau of Public Roads, on page 195.

Dr. BALL. Mr. MacDonald will explain that item.

ROAD CONSTRUCTION, DEVELOPMENT OF HIGHWAYS.

Mr. MACDONALD. Mr. Chairman and gentlemen of the committee, the work of the Bureau of Public Roads is divided into two principal activities. The first is the administration of the Federal aid road laws and the research and investigational work that has to do with the development of public roads. The second is the agricultural engineering work, having to do principally with investigations, with farm irrigation and drainage, and mechanical problems incident to the farmers' work. The Secretary of Agriculture is charged with the administration of the Federal aid road acts. This duty of the Secretary is administered through the Bureau of Public Roads. This particular duty is not made a part of the departmental budget with which we are dealing before this committee, but all of the investigational and research work, the economic studies with reference to highways, the tests of materials and the studies which we are making to advance scientific road improvement are included in the budget now before you. The bureau, in addition to the administration of the Federal aid road laws, is endeavoring to develop road building from the status of an indefinite art to a really scientific procedure.

To illustrate the importance of the work, perhaps the development in the highway rolling stock over the last few years is the most significant and the most illuminating. I have here a chart showing the development of motor vehicles registered in the United States. In 1910 there were less than half a million, 487,000; in 1916 there were 3,394,000; in 1921 there were nearly 9,000,000 automobiles alone.

Mr. ANDERSON. That is supposed to be operating automobiles?

Mr. MACDONALD. These are actually registered, and we assume there are no considerable proportions of registrations carried on automobiles that are not operating, at least irregularly. The same story that has been told by the automobiles is told by the trucks, and we expect the growth in the use of trucks will be very much more significant during the next few years. In 1910 there were only 14,000 trucks registered in the United States; in 1916 there were 250,000, and in 1921 there were 1,346,000, an astonishing growth in that five-year period. Apparently it is the truck registration now that is preventing the curve of motor vehicle registration from breaking sharply. That is, the purchase, apparently, of automobiles has fallen off, but the curve of registration which for several years has been almost a vertical line, the trucks are now tending to keep from breaking sharply. This chart shows the combined registration of both automobiles and trucks increasing from a half million in 1910 to about 10,000,000 for last year. These figures are indicative of the rolling stock available for the highways. We have lagged seriously behind in providing suitable roadbeds for that rolling stock.

Mr. Chairman, I have attempted to bring before the committee some of the larger statistics in all the work that we do, not so much to go into detail, but to point out the boundaries of the fields in which we are working in the different lines. This chart shows in a graphic way the expenditures on a comparative basis.

Total cash expenditures for roads.

Year.	Road maintenance.	Total road expenditure.
1910	$25,000,000	$120,000,000
1916	68,000,000	272,634,000
Total 1910 to 1916	312,000,000	1,370,374,000
1917	73,000,000	279,915,000
1921	180,000,000	600,000,000
Total 1917 to 1921	584,000,000	2,055,472,000
Grand total	896,000,000	3,425,846,000

For the period from 1910 to 1921, deducting our maintenance expenditures, we had put into road construction $2,529,846,000, but for the year 1921 we had an investment estimated at $8,322,000,000 in rolling stock. To arrive at this estimate we valued trucks at $1,500 each and automobiles at $750 each. In 11 years our motor vehicles registered increased over 1,800 per cent. In 1918, based on the producing power of the dollar, we had increased out expenditure for road purposes over 1910 less than 20 per cent—that is, we produced for the year 1918, when we measured the results by the purchasing power of the dollar, less than 20 per cent more than in 1910. We did raise our production of roads for 1921 to about two and two-thirds that of 1910.

Mr. ANDERSON. In order to make a comparison between rolling stock and roads, would you not have to take into consideration the relative life of the two propositions over a period of years?

Mr. MACDONALD. The comparison is only made to point out the relative investments we have been making in rolling stock and roadbeds. From 1910 to 1921 our aggregate expenditure for highway construction was only about one-third of the investment that we had in 1921 in motor vehicles. That is, in the 11-year period we actually invested in roadbed only about one-third, or less, of our investment in rolling stock. I am not attempting to make a direct comparison, but I am trying to bring out this thought, that during the last 11 years there has been a lag in our development of highways far behind our development of rolling stock, as a broad statement and without attempting to fix any definite percentage or proportion.

ECONOMIC STUDY OF USE OF HIGHWAYS.

Mr. WASON. Does your rolling stock have any relative bearing on the use of the roads?

Mr. MACDONALD. Yes, sir. That is the entire point—each motor vehicle is a potential user of the highway. We know that they do not all use the rural highways, but each motor vehicle is a potential user of the highway, because as soon as the highway is improved in its vicinity then it becomes a user of the highway.

Our traffic over highways has increased from 500 per cent to 1,000 per cent. That is, we have the actual traffic count before and after the development of the motor vehicle, and the traffic census has become something more than a mere counting of the number of vehicles passing over the highways. It has become an actual study of transportation. On the Boston post road this year we found trucks hauling every conceivable commodity and on regular schedules up to 200 miles in distance. That is one of the lines of study that we have been carrying on under our studies in highway economics. Under the new Federal highway act we are required to select a system of main highways, with the cooperation and initiation of the State highway departments, to be composed of the primary system or interstate roads and the secondary system or intercounty roads, totaling not over 7 per cent of the public-road mileage within each State, and upon this system the Federal aid funds are to be spent.

In a very general way this outlines one of the major lines of activity of the bureau and indicates the necessity of this work which we are doing under the Budget of making the economic studies of highway utility. Likewise the physical studies of the effect of the rolling stock upon the roadbeds has been a very important line of work, particularly during the past two years. Also the studies of the economic returns of the highways, which in my judgment is going to be one of the major phases that we must think about in the future. That is, who is to pay the cost of furnishing the roadbed for all of this rolling stock, and whether we should not charge highway transportation a larger proportion of the roadbed costs, the same as we charge the railroad transportation. We are going through what may be likened to the period when we gave the railroads public lands to aid their development. Finally we came to the point where we put all of the cost of the building and maintaining the railroads upon that form of transportation. I do not believe that we can much longer carry as a property tax upward of 80 per cent of the cost of highway building, but rather that we must charge more of that cost to highway transportation, as such.

MOTOR VEHICLE LICENSE TAX.

Mr. **Anderson**. Is there a wide variation in the cost of construction and maintenance that is imposed upon vehicles in the different States?

Mr. **MacDonald**. A very wide variation. We are making a study now on the laws under which the different States are operating, and there is wide discrepancy, which is not justified, particularly since a good many of these vehicles are engaged in what may be called interstate transportation. This is particularly so in the East, where the States are smaller.

We find a wide discrepancy in license fees in property taxes and in wheel taxes. There is still another tax coming into use now—the gasoline tax. So we find the automobile in one State paying considerable more revenue than the adjoining State.

Mr. **Anderson**. Is the license tax segregated from the other tax?

Mr. **MacDonald**. The license tax and the gas tax are generally segrated for road purposes, but the property taxes and other taxes ordinarily go to the general revenues. Our estimates of the division of the funds that were expended for road building last year place about 19 per cent of the entire revenue as coming from the motor vehicle license fees. About 14 per cent came from Federal aid, that is, the Federal Government paid about 14 per cent of the total expenditure. These two sources total 33 per cent, leaving 67 per cent of the total from property taxes. It is one of the big questions that we must study and bring to some conclusion in the future. We have a road program now that last year cost the United States about $600,000,000 and it hardly seems fair that 67 per cent of the total should be paid as a property tax when we have 10,000,000 motor vehicles operating on the roads. Our public roads on the basis of the 1921 expenditure are really only costing us, per individual, one and a fraction cents a day. Each one of us certainly receives more benefit every day from the public highways considering the single item of the food we eat which comes over the public highways.

ASSESSMENT FOR ROAD CONSTRUCTION AGAINST ABUTTING PROPERTY OWNERS.

Mr. Anderson. Are there many States in which the cost of road construction or any part of it is assessed against the abutting property owners?

Mr. MacDonald. There are a very few States in which the cost, or proportion of the cost, is assessed against the abutting property, but this plan has not been found to be a very practical method of operation. There are some States in which conditions are such that it is probably fair to assess a small part of the cost of improving highways against the property. In any event, any assessment made against property ought to be determined by the special benefits in the way of improved transportation which the particular property receives. The principle of the assessment for special benefits is largely applied in the making of public improvements but this principle is not in general use in financing highway improvement.

Mr. Anderson. I do not see how it is fair.

Mr. Wason. Neither do I.

Mr. Anderson. Unless there is some increase in land value, certainly it can not be put on a basis of proportionate use.

Mr. MacDonald. In some States the conditions along two roads are so nearly equal that it would be possible for the authorities to select a road for improvement along either one of two parallel routes, all other conditions being so nearly equal that in building a road between two towns the public could be equally well served by following either one of the two routes. In such a case, which is not uncommon, particularly in the Mississippi Valley, there is a certain added benefit to the property immediately adjoining the route chosen for improvement which undoubtedly makes the property more salable at somewhat higher figures than the land lying farther away from the improved road. If the road, however, were already improved to the extent necessary to provide adequate transportation facilities to the land, the mere changing of the type of road to a different form such as the substitution of a concrete road for a gravel road, it is doubtful whether there would be any increase in the value of the road to the farm and under such conditions no assessment should be made. However, the special assessment for highway improvements is not generally used, and not generally advocated by those in administrative charge of highway improvement.

In the older developed States such as New York and Massachusetts, where the highways have been pretty generally improved, I doubt if the construction of better or higher types of improvement will add greatly to the value of the land; that is, they have already provided sufficient facilities to give the transportation which their agriculture needs. But in the Mississippi Valley any part of the cost paid by an assessment against the property would be a charge which might be justified from a standpoint of priority; that is, for bringing transportation facilities to that particular piece of land before it reaches other lands in the same vicinity.

I would like to bring up this point, that in California the study that we made last year showed the average increase in population along the improved roads was 63 per cent in the last decade, while the average increase in population in the State was about 43 per cent. These figures are exclusive of the two largest cities and indicate a difference of nearly 20 per cent in the increase of population along the improved roads as compared with the average in the State. Of course, other factors have an influence in bringing about this condition, but I think it is fair to draw the conclusion that road improvement has been a large contributing factor in making the land along these roads more desirable and more salable, and that these factors have undoubtedly increased the price over other lands of equal value further removed from the improved highways; but it is also probable that on the main lines, after the amount of traffic has passed a certain maximum per day, that there are some disadvantages in being located on a very heavy traffic road from the agricultural standpoint. That is why we are trying to develop more lines of highway rather than to concentrate more traffic on fewer lines. Instead of trying to develop one main line between two centers of population we are building two or three lines but through different territories at certain distances apart, so that the traffic actually will be dispersed rather than concentrated. This development is already evident in New York State and in other of the Eastern States.

Mr. WASON. If your road is constructed through an agricultural community and the farmer has a farm on both sides of the highway, do you think that the use of these trunk lines is of any particular benefit to the farmer?

Mr. MACDONALD. No, sir. I was answering the question on the basis of more general road improvement. The 7 per cent system provided under the Federal aid act is more extensive than a trunk-line improvement. It comprises an intercounty-seat system of highways and will bring improved roads into the vicinity of all of the lands within the State eventually.

Mr. WASON. But the bulk of the mileage of Federal-aid roads will be through what is known as agricultural territory?

Mr. MACDONALD. Yes, sir.

Mr. WASON. And you would naturally differentiate between agricultural territory and the abutter on the road living in agricultural territory or an improved town or municipality where the road goes through a village or a congested district?

Mr. MACDONALD. Oh, yes; certainly.

Mr. WASON. And as you assess against one you have got to assess against all, against both groups?

Mr. MACDONALD. Yes; but not a very large part of the total cost should be assessed, only that part of the cost which the property owner should be willing to say, "I will pay for the added advantage of bringing this improved road alongside of my land." Under present conditions, I should think not over 10 per cent of the total cost. Perhaps it is hardly necessary for us to dwell upon the question, because I doubt if it is a practicable thing to do.

These questions and similar ones fall within the economic studies of highway improvement and are the ones which are giving us most concern. They are similar in character to the economic problems occurring in all other lines.

AGRICULTURAL ENGINEERING DIVISION.

I will turn from consideration of the highway division of our work to that of the agricultural engineering. Our agricultural engineering division has been rather starved in its development. In this division we have the three sections—irrigation, drainage, and farm mechanical problems—which we are undertaking to develop.

I have a few charts which are illustrative of the larger fields in which we are working. This chart [indicating] shows the division of all of the acreage irrigated in 1919 among the different agencies supplying water. Figures taken from the census reports show the total acreage irrigated in 1919, amounting to 19,191,716, divided as follows:

Distribution of acreage irrigated in 1919, by type of enterprise.

Type.	Area irrigated, 1919.	Per cent of total.	Type.	Area irrigated, 1919.	Per cent of total.
	Acres.			*Acres.*	
Individual and partnership	6,848,807	35.7	Carey Act	523,929	2.7
Cooperative	6,581,400	34.3	United States Indian Service	284,551	1.5
Irrigation districts	1,822,887	9.5	Other	53,572	0.3
Commercial	1,822,001	9.5			
United States Reclamation Service	1,254,569	6.5	Total	19,191,716	100.0

Acreage irrigated in 1919 and included in enterprise 1920, by type of enterprise.

	Acreage irrigated.	Acreage enterprises were capable of irrigating.	Acreage included in enterprises.
Individual and partnership	6,848,807	9,256,756	13,008,415
Cooperative	6,581,400	8.403,298	10,628,543
Irrigation district	1,822,887	2,531,425	3,432,109
Carey Act	523,929	804,298	1,188,937
Commercial	1,822,001	2,799,568	3,999,581
United States Reclamation Service	1,254,569	1,680,643	2,627,176
United States Indian Service	284,551	484,486	932,985
State	5,620	7,379	9,581
City	40,146	44,458	49,650
Other and mixed	7,236	8,546	13,144
Not reported	570	625	700
Total	19,191,716	26,020,477	35,890,821

This chart [indicating] shows the same division of the acreage irrigated as the other chart, but shows also the additional area for which water was ready in 1920, and the total area in the enterprises. The area for which water was ready in 1920, but which was not irrigated in 1919, amounted to a little less than 7,000,000 acres, and the additional area in existing enterprises for which the water was not yet ready in 1920 was about 10,000,000 acres. The total area irrigated in 1919 was about 19,000,000 acres, while the total in enterprises was 35,890,000, showing that we have developed only a little more than half of the acreage in enterprises at the present time. This map [indicating] shows the location of the irrigation districts in the United States, illustrating in a broad way the location of the irrigation work which we are undertaking.

This chart [indicating] shows the area in drainage enterprises in the United States, by decades, and the capital invested.

Drainage enterprises undertaken in the United States and capital invested.

Date of organization.	Acres.	Capital invested.	Date of organization.	Acres.	Capital invested.
Before 1860	97,319	$182,716	1900–1904	7,606,753	$26,706,464
1860–1869	783,357	1,689,852	1905–1909	14,593,488	76,662,073
1870–1879	2,077,717	8,126,391	1910–1914	17,339,067	120,136,992
1880–1889	5,424,294	23,934,330	1915–1919	11,316,559	86,921,853
1890–1899	6,026,937	24,498,861			

Total area in operating drainage enterprises in United States, 65,495,038 acres.

Mr. **Magee**. Does this come under public roads?

Mr. **MacDonald**. Yes; in its relation to agriculture. It is under the agricultural engineering division of the bureau. You understand that we are not an operating concern, such as the United States Reclamation Service, which actually builds works to bring the water on the land; but our work is confined largely to research in irrigation and drainage practice, also agricultural engineering and economic lines, also giving advice to the farmers and the people who have been putting water on the land or removing surplus water—sometimes without very much attention to correct engineering or agricultural practice. We are doing the only research work in irrigation that is being done by any branch of the Federal Government, and the same general statement applies to drainage. This chart [indicating] shows the acreage put under drainage by decades. The effect of the war in stopping the drainage work is very apparent here [indicating].

Mr. **Anderson**. Is that cumulative?

Mr. **MacDonald**. No, sir; it is by decades. This chart [indicating] shows the progress in two States. In Minnesota the work began in 1880.

Drainage enterprises undertaken in Iowa and Minnesota, and capital invested.

Date of organization.	Acres.	Capital invested.	Date of organization.	Acres.	Capital invested.
Iowa:			Minnesota:		
1870–1879	3,400	$34,388	1880–1889	11,626	$88,643
1880–1889	14,782	26,660	1890–1899	319,941	481,097
1890–1899	71,216	277,848	1900–1904	883,427	1,673,222
1900–1904	385,688	2,019,819	1905–1909	2,370,214	7,525,768
1905–1909	1,659,488	11,288,616	1910–1914	3,867,415	13,421,995
1910–1914	1,629,897	17,290,526	1915–1919	1,765,875	18,747,547
1915–1919	1,447,246	18,619,833			

Mr. **Anderson**. Does that chart include tiled land or does it simply include swamp land?

Mr. **MacDonald**. It includes all drainage enterprises where the land is assessed for benefits; it does not include the land tiled by the farmer.

Mr. ANDERSON. That is what I want to know.

Mr. MACDONALD. This chart [indicating] shows the money invested by years. In Indiana, for instance, it is approximately $30,000,000. In Iowa and Minnesota, the greater part of the work was done from 1900 to 1920; these are the organized enterprises, or drainaged districts, which can be measured. I do not have an estimate of how much the farmers have done themselves.

Mr. WASON. It would be much greater than that?

Mr. MACDONALD. Yes; it would be much greater than that. The value of the buildings has increased during the decade from a little over six billion to about eleven and a half billion. The value of the animals has not increased so fast. During the period of the war the increase in the value of the buildings was very material. This chart [indicating] shows the number of farms having water piped into the house, gas or electric light, and telephones.

On this chart [indicating] is shown information in regard to the present total value of farm buildings, implements and machinery, and the increase in value during the last 10 years. These data are taken from the 1920 census.

	Total value.	10-year increase.	Per cent.
Buildings	$11,430,855,631	$5,105,404,103	80.7
Animals	7,996,362,496	3,071,182,886	62.4
Implements and machinery	3,595,317,021	2,330,167,238	184.2

Number of farms	6,448,336
Number having water piped into house (10 per cent)	644,088
Number with gas or electric lights (7 per cent)	452,809
Number having telephones (39 per cent)	2,508,002

Perhaps this is a detail, but here is a diagram [indicating] illustrative of some of the studies which we are making in the planning of farm buildings that would modify some of the expenditures now being made in farm buildings. The upper figure shows the barn as suggested by the owner. The lower our design of the barn. It has the same number of pens and the same number of stalls for the cows, but the length has been decreased by 6 feet and the cost reduced about 10 per cent. This is a typical plan of a farm building [indicating plan of potato house]. In this instance it has been worked out in cooperation with the Bureau of Markets. The Agricultural Engineering Division is called upon to do the engineering and architectural work for all the other bureaus of the department. We get a request from the Bureau of Markets to prepare plans for storing sweet potatoes in order to hold them and dry them for the market, and then it is our business, in cooperation with the sweet potato specialist, to work out a satisfactory storage plant. More than 10,000 of these plans have been distributed. This [indicating chart] shows the results of our studies in the ventilation of barns. In the barn without regulated ventilation the temperature changes are quite rapid, and considerable change takes place inside the barn. In the other barn with the ventilation regulated the temperature is more uniform, and the temperature is about the same as in the first barn, although the temperature outside was considerably lower.

DEVELOPMENT OF MACHINES AND USE OF POWER ON FARMS.

Now, I do not want to go into these too much in detail, Mr. Chairman, but I want to point out the development of machines on the farm, and something of their value as shown by this table—tractors and other farm engines, tractor-drawn field machines, horse-drawn field machines, belt machines, and farm wagons:

Value of farm machinery, etc., manufactured in 1920.

Tractors	$193,600,000
Other farm engines	31,300,000
Tractor-drawn field machines	34,500,000
Belt machines	37,800,000
Horse-drawn field machines	150,800,000
Farm wagons	29,700,000
Total	477,700,000

This illustrates particularly the place that the tractor has obtained in a very short time in its relation to other farm machinery.

The following table shows the increase in the manufacture and sale of tractors from 1916 to 1920. In 1920 there were sold in the United States 162,988, and for export 29,143. It shows from 1916 to 1920 a remarkable increase in the number of tractors manufactured and sold.

The manufacture of farm tractors in the United States.

	1916	1917	1918	1919	1920
Number manufactured	29,670	62,742	132,697	164,590	203,207
Number sold in the United States	27,819	49,504	96,470	136,162	162,988
Number sold for export	....	14,854	36,351	19,693	29,143

Along the line of the economic studies bearing on the use of power on the farm and the best kinds of power, the following table shows the average cost in 1921 of power for drawbar work on farms where tractors are owned in three areas in the winter wheat belt of Oklahoma, Kansas, and Nebraska. The northern area centers around Phelps County, Nebr., the western area around Sherman and Thomas Counties, Kans., and the southern area around Harper County, Kans., and Alfalfa County, Okla. While these are rather large farms, the interesting feature, perhaps, which should be brought out is that the average cost of power per year is not far from $1,000, approximately half the cost being chargeable to the tractors and half to the horses.

Cost of power for drawbar work—354 farms where tractors are owned—winter wheat belt, 1921.

	Number of farms.	Crop acres per farm.	Horses per farm.	Annual cost of power.		
				Horses.	Tractor.	Total.
Northern	127	299	7.4	$516	$357	$873
Western	107	516	10.5	521	520	1,041
Southern	120	263	7.5	583	585	1,168

The following table shows the division of the work of plowing, fitting ground, seeding, planting, cultivating, harrowing, harvesting, hauling manure, miscellaneous work, and road hauling between horses and tractors on farms where tractors are owned in Ohio, Indiana, and Illinois. This is one of the features brought out in an investigation of the cost and utilization of power made in those States in 1920.

Proportion of different operations done with horses and with tractors on 286 farms in Ohio, Indiana, and Illinois, 1920.

Operation.	Days of horse labor per farm.	Horse day equivalent of tractor work.	Total	Percentage done with tractors.
Plowing	18.9	109.2	128.1	85.2
Fitting ground after plowing	34.5	68.4	102.9	66.5
Seeding grain	11.8		11.8	
Planting corn	12.2		12.2	
Cultivating	80.4		80.4	
Haying	17.4	1.5	18.9	7.9
Cutting grain	10.7	7.4	18.1	40.9
Thrashing	31.3		31.3	
Corn harvest	99.0		99.0	
Other field work	4.4	7.9	12.3	
Hauling manure	43.8		43.8	
Other work on farm	49.1		49.1	
Road hauling	36.4		36.4	
Total	449.9	194.4	644.3	30.1

Mr. Anderson. The tractor seems to be getting in its work in plowing.

Mr. MacDonald. Largely in plowing, disking, and other work in fitting the ground. You see, the horse has not been replaced to any marked extent for the lighter farm operations.

I might say that some of the results of this study may have been brought before this committee by either the Bureau of Animal Industry or the Bureau of Agricultural Economics, as this was a triangular investigation carried on under the direction of the farm-power committee of the department. This committee is composed of the chiefs of the three bureaus.

The table below shows the time saved at plowing, disking, harrowing, and cutting grain by the use of tractors on these same farms.

Time saved by tractors—286 farms, Ohio, Indiana, and Illinois, 1920.

Time required to cover 100 acres:	Days.
Plowing—	
3-plow tractor	11.6
2-plow tractor	15.4
Horses	37.0
Disking—	
3-plow tractor	3.2
2-plow tractor	4.6
Horses	6.0
Harrowing—	
3-plow tractor	1.9
2-plow tractor	2.6
Horses	3.8
Cutting grain—	
3-plow tractor	4.3
2-plow tractor	5.1
Horses	6.4

Mr. **Anderson**. I do not just get the significance of that chart.

Mr. **MacDonald**. The figures show the number of days required to cover 100 acres at the different operations with tractor and with horses.

Mr. **Anderson**. I get the idea now.

Mr. **MacDonald**. You see, when you get down to the cutting of grain and harrowing, the saving of time effected by tractors is not so marked.

The following table shows some of the results of a similar investigation on the use of motor trucks by farmers which was made last year. This has been of interest to farmers in showing the cost of operating trucks of different sizes, not only the total cost but the different items making up the cost. We have determined the depreciation, fuel, oil, tire, repair, interest, and license charges. It shows that the cost per mile for the operation of a half-ton truck under farm conditions was a little over 8 cents and for the 2-ton truck a little over 20 cents.

Cost of operating farm-owned motor trucks of different sizes on 753 eastern farms, 1920.

	Size.				
	½-ton.	¾-ton.	1-ton.	1¼ and 1½ ton.	2-ton.
Fixed charges:					
Annual depreciation	$491	$184	$152	$256	$312
Annual repairs	50	75	75	100	150
Annual interest	21	45	33	63	83
Annual registration and license fees	10	15	18	22	26
Total fixed charges	172	319	278	441	571
Miles traveled per year	3,790	4,370	3,660	3,100	4,070
Fixed charges per mile	$0.045	$0.073	$0.076	$0.142	$0.140
Gasoline and oil per mile	.021	.025	.027	.031	.038
Tires per mile	.016	.029	.016	.017	.025
Total cost per mile	.082	.127	.119	.190	.203

Mr. **MacDonald**. I have attempted to cover in my general statement the major fields that the bureau covers, and I am now ready to take up the items.

Mr. **Anderson**. If you have finished your general statement, we will take a recess until 1.30 to-morrow afternoon.

Wednesday, February 8, 1922.

MAKING USE OF EXISTING AGENCIES, ETC., IN NATIONAL RESEARCH PROGRAMS.

Mr. **Anderson**. Mr. MacDonald, did you finish your general statement yesterday?

Mr. **MacDonald**. I wish to add to the general statement, Mr. Chairman, only one or two more items. The work of the bureau in both of its major features—that is, both the public-road work and the agricultural-engineering work—is almost entirely on a cooperative basis. In the Federal-aid road work we function with and through the State highway departments of each State. In the economic and research activities we are working largely with the National Research Council, and helping to support that agency in an endeavor to bring all the research agencies engaged upon highway problems, either engineering or economic, into a comprehensive, correlated national research program, making use of the existing agencies and plants for this purpose.

For example, in the highway engineering research there are available at the universities and colleges laboratories in which are located test machines and equipment which represent large investments. There are usually in charge of such laboratories professors, instructors and technical assistants who have at least their vacation times away from their college duties. These laboratory plants are not used for their full time under any conditions. It has been our idea in the development of the national research program to make use of all these existing agencies and plants as far as we can, and to encourage these institutions to do research work pertaining to the development of highways and highway transportation as a part of the national research program.

I submit another diagram for the purpose of supporting on a larger scale the relation that has existed since 1910 between our highway expenditures and the registration of motor vehicles, for the purpose particularly of pointing out the immense development and investment that we have made in rolling stock for the highways and the projected development in the future.

This diagram shows at the edge of the curve representing automobile registration a rather sharp break for the year 1920, which was to be expected under the conditions existing, but while still the registration in trucks has tended to hold the curve from breaking as sharply as the automobile registration alone so that we are anticipating larger relative future development in trucks than in automobiles. Also it is interesting to note the production of highways based on the fluctuating value of the dollar, which bears out the statement I have made before that in 1918 we were producing very little more per year, with about 1,200 per cent increase in our rolling stock, than we were eight years before in 1910. That is, there has been a lag in providing the roadway over which to use the rolling stock. I qualified that statement yesterday by saying that the investments in roads and in motor vehicles are not exactly comparable but indicative.

Mr. **Buchanan.** What do you mean by those figures up there "registration"?

Mr. **MacDonald.** The number of registered motor vehicles.

Mr. **Buchanan.** Privately owned, licensed vehicles?

Mr. **MacDonald.** Licensed; yes, sir.

Mr. **Buchanan.** Licensed by what?

Mr. **MacDonald.** By the States.

Mr. **Buchanan.** By the States in the Union?

Mr. **MacDonald.** Yes, sir.

Mr. **Buchanan.** That is State funds, too?

Mr. **MacDonald.** The road funds which I have included there include all the funds, township, county, State, and Federal, and of the receipts for motor vehicle licenses last year, $600,000,000, our estimated division of the fund was about 19 per cent of the total motor-vehicle licenses and about 14 per cent Federal aid, the rest being the income from the local and States sources, partly from bonds and partly from taxes.

SALARIES.

Mr. **Anderson.** Now, we will take up the item of salaries on page 195. The first item is an increase in the salary of the chief of the bureau. I presume you do not care to discuss that?

Mr. **MacDonald.** No, sir.

Mr. **Anderson.** The next item is for an instrument maker and a model maker at $1,800, which you are transferring to the lump sum.

Mr. **MacDonald.** Those men were taken off of the statutory roll and put on the lump-sum roll some time ago because they are used principally in connection with the testing and physical research work which is already carried on the lump-sum rolls now.

Mr. **Anderson.** These items are simply dropped, then?

Mr. **MacDonald.** Yes, sir.

Mr. **Anderson.** Then you have an increase in clerks from three to four, at $1,500 each.

Mr. **MacDonald.** That is a transfer of one clerk of $1,500 from one of the lump-sum rolls back to the statutory roll.

Mr. **Anderson.** Do you know what fund that comes out of?

Mr. **MacDonald.** The charwoman is transferred from the lump-sum roll. There has been, therefore, no actual increase in the number of employees asked for on the statutory roll.

Mr. **Anderson.** There is no change in the item for general expenses on page 196?

Mr. **MacDonald.** No, sir.

INVESTIGATION OF SYSTEM OF ROAD MANAGEMENT AND HIGHWAY CONSTRUCTION.

Mr. **Anderson.** The next item is, on page 197, for inquiries in regard to systems of road management and economic studies of highway construction, operation, maintenance, and value, either independently or in cooperation with the State highway departments and other agencies, and for giving expert advice on these subjects. You are asking for an apparent increase of $16,800.

Mr. **MacDonald.** That is an apparent increase of $16,800. We have taken one instrument maker at $1,800 from the statutory roll over to that fund.

Mr. **Anderson.** Well, if he is already there you are paying him out of that fund.

INVESTIGATIONS INTO WEAR AND TEAR OF ROADS, ETC., BY OVERLOADING OF TRUCKS.

Mr. **MacDonald.** That makes an actual increase of $15,000 considering both funds. This is the only increase that we have asked for the road work proper. This increase is for the purpose entirely of providing for a somewhat enlarged program of economic research, particularly along the lines of highway traffic, in which we are making extensive surveys. In the State of Connecticut, in cooperation with the State highway department, we have carried on traffic surveys this year which have developed the fact that our highways are no longer a matter of utility for the immediate neighborhood or of local concern, but must be given large weight in the transportation problem as a whole.

We found in this traffic census, for example, that all sorts of materials of both a commercial or agricultural character were going over the highways in large quantities. Probably a very considerable part of the damage to our roads is not because of a large amount of traffic over them, but because, as revealed by this study, a large part of the traffic was carried on overloaded trucks—that is, the trucks were loaded beyond their capacity. We found that 75 per cent of regular trucking was overloaded beyond the capacity of the motor vehicle itself.

Mr. Anderson. What is the practical applicability of that work?

Mr. MacDonald. It is information that will determine the whole matter of regulation of traffic upon the highways and have a large influence on the engineering design.

Mr. Buchanan. You mean it looks ultimately to the State enacting legislation to control the breadth of the casing or tire and the amount of load?

Mr. MacDonald. Exactly, and also the speed.

Mr. Buchanan. Well, the speed is regulated now, is it not? Of course, this might throw some further light on speed regulation.

Mr. MacDonald. We have to have this information in order to connect up the work which we are doing in making studies of the physical behavior of roads under loaded vehicles.

Mr. Buchanan. In other words, I gather from what you state that a truck with a certain width of tire, with a heavy load, might tear up a certain road at a certain speed, that there is a proper type of tire to run on that road?

Mr. MacDonald. Yes, sir.

Mr. Buchanan. And you want to develop the fact of what is proper road?

Mr. MacDonald. Yes, sir. To illustrate further the applicability of this information, the traffic census—that is, measuring the amount of traffic that our highways are carrying—is a measure of the economic importance of the highway. In other words, it indicates whether we are investing funds to good advantage or not in building highways. Second, the traffic census gives us a classification of the motor-vehicle traffic which will have a bearing upon the legal limitations that should be imposed. For example, we will find that out of all of the truck traffic on the highways there are certain ordinary maximum loads which are only exceeded by a very small percentage of the total traffic. When these ordinary maximum loads are fixed, there is no apparent need for building much heavier highways. Certainly no very large additional expense is justified to take care of a very small percentage of the total traffic. In determining the legal limits, however, there are other factors beside gross loads that should be given weight.

Mr. Anderson. Is the ton-rate capacity of a truck as it comes from the factory—for example, a half-ton truck or a 1-ton truck—fairly representative of its carrying capacity?

Mr. **MacDonald**. It fairly represents the carrying capacity that the manufacturer has designed the truck to carry, but we have found through this traffic study that the truck operator apparently determines the load by the capacity of the body.

Mr. **Anderson**. In determining the overloading at 75 per cent, you use the manufacturer's rating as a basis?

Mr. **MacDonald**. We use the manufacturer's rating plus 5 per cent, to be rather liberal, but if we had allowed a 10 per cent increase in his rating it would not have decreased the percentage of overloading materially. That is, the overloads were sufficiently beyond the capacity given by the manufacturer that even if we had allowed a 10 per cent addition to his rating, we would have had about the same proportion of overloading.

Mr. **Anderson**. Is not there in most of the trucks a considerable margin of capacity which the rating does not indicate?

Mr. **MacDonald**. No, sir. If you mean as to the compliance of the vehicle with the legal requirements, such as tire widths, there is not the additional capacity, but if you mean, will the truck break down under this additional load, I would say probably not while the vehicle is new; but there is not a margin of safety that the ordinary user of trucks thinks there is, The truck manufacturers are unable to foresee the exact conditions under which their trucks will be used and design to meet the average conditions. Under favorable conditions, the truck so designed will carry heavier loads Sometimes trucks are sold on the argument that they will safely carry an overload. There are very few trucks, however, which can be loaded beyond their rated capacity without exceeding the usual maximum load per inch width of tire allowed. The best manufacturers are making a determined fight against overloading not only because of the effect on the vehicle but also on account of the effect on the road.

Mr. **Anderson**. Is there anything that shows that the wear and tear on the road is greater as a result of the overloading than it would be if the trucks were only loaded to capacity?

Mr. **MacDonald**. Yes, indeed. The gross weight, within certain limits, of the truck is not the determining factor. The deterioration of roads is caused first of all by the impact of the wheel load, the concentrated load on the wheel. For example, under certain conditions a 3-ton truck will damage a road more than a 5-ton truck. Next in importance is the concentration of the load on the two axles, front and rear. We find a variation in trucks as between the proportions of load carried, front and rear, as much as 30 per cent. For example, the average well-designed heavy truck will carry about 70 per cent of its load on the rear wheels, but there are other trucks which go to 95 per cent of the total load on the rear axle. That is, there is a variation in trucks of the same rated capacity of 30 per cent in the gross load on the rear axle. So it is, first of all, the unsprung wheel load; second, the axle load; third, the tire equipment; and, fourth, the spring equipment, that determines——

Mr. **Buchanan** (interposing). How about the speed?

Mr. **MacDonald**. That is a factor in truck operation. I am now referring particularly to the various important factors in the design of the trucks.

Mr. **Anderson**. Does the size of the wheel have any relation to the wear on the road?

Mr. **MacDonald**. The diameter of the wheel?

Mr. **Anderson**. Yes.

Mr. **MacDonald**. If so, we have not yet been able to determine it. I can conceive that it would be a factor, that it would have an effect, but I am unable to make any definite statement as to the comparative effect of different sizes of wheels. However, I can make some very definite statements as to the different kinds of tire equipment. Most heavy trucks operate on solid tires. The damage to the roads is caused primarily by the impact of the rear wheels and that impact is determined by the unsprung weight of the rear axle and rear wheels and the truck speed, so that the heavier the rear unsprung construction the larger will be the impact. The blow on the road due to an irregularity in the road surface consists of two parts, first the impact of all the weight below the springs and second, the following impact of the weight above the springs. The load being carried by the truck tends to follow a straight line, so that we do not get at the same point on the road the blow of the wheel and of the body itself.

A truck body moving along the road with the springs not loaded beyond their figured capacity will tend to adjust the line of the load to practically a straight line, so that we get very little impact from the body and the load of the vehicle.

If we decrease the thickness of the solid rubber tire to one-half of the originalw thickness, we increase the impact 100 per cent. That is, a tire worn to one-half of its original thickness increases the destructive blow of the wheel upon the road 100 per cent. With pneumatic tires the effect of the blow can be 25 per cent of that delivered by solids, being in some cases but 15 per cent greater than the static wheel load.

Mr. **Anderson**. Will you repeat that? I do not quite get that.

Mr. **MacDonald**. I will put it this way: The weight of the truck standing still is the static load.

Mr. **Anderson**. Unloaded or loaded?

Mr. **MacDonald**. Loaded, as it stands. We move the truck along the road and if the road is not entirely smooth, so that a slight jump in the tire occurs, because of going over an obstruction or into a depression, or even if the tire is worn——

Mr. **Ball**. You mean if the tire is un-uniformly worn?

Mr. **MacDonald**. Yes. So as to get even a slight bump. One that is worn one-eighth, one-quarter, or one-half an inch. One-half an inch would be a large bump and a quarter inch bump would produce the effect of an impact, with a truck moving at a rate of speed of about 15 or 20 miles an hour. We find the average impact on the road, that is, the blow that is delivered to the road, is equivalent to about four times the static load. I think that statement is plain now.

Under certain conditions this impact can be as much as seven times the static load or seven time the weight of the truck wheel standing on the road.

Mr. **Buchanan**. And if the rubber casing is half worn, then what?

Mr. **MacDonald**. If the rubber casing is half worn we can get 100 per cent more, or 14 times. On the other hand we have found that with some tires the impact is but 15 per cent more than the static load.

EFFECTS OF MOTOR VEHICLES ON DIFFERENT TYPES OF ROADS.

Now, Mr. Chairman, that gets into a discussion of the other work that we are doing, such as making tests and actually measuring the effects of motor vehicles of all kinds upon the different types of road. We are not confining that to the high types of road. For example, we are making a very careful study in the South on methods of holding a sand-clay road under heavier traffic. For the last two years we have been making a series of studies of gravel roads in Vermont, Maine, Massachusetts, and New Hampshire and out through Wisconsin, particularly to develop methods of maintenance that will eliminate the wash-board or "chatter" effect. Those studies we are carrying on in cooperation with State highway departments. We ordinarily detail one or two men to the work and the State highway departments do the same. We are carrying on economic studies in the same way. In Connecticut the State highway department and the bureau each pay part of the cost.

Mr. **Anderson**. Are these studies on sand-clay roads made under this item or is this item confined to the matter of collecting data?

Mr. **MacDonald**. We have three lines of interdependent studies, Mr. Chairman, all of which involve economic and physical studies. Part of such studies are carried under this item, for example, the men who take and work up the results of traffic census on the highways are ordinarily carried under this item. In other words, the men who handle the economic work and the statistical work are carried under this, while field studies of construction and maintenance are handled under the other item. The two items can hardly be separated absolutely, and we do actually pay for the two classes of work out of one appropriation, depending upon which is the major and which the minor results we are securing. This particular item is being used for the major purpose of collecting highway-transportation data, especially of an economic character. In addition to such studies we are carrying on this year a national survey, which we carry on every five years, to obtain the results of all the work that has been accomplished for the five-year period, the funds that have been made available, bonds that have been issued; in other words, to get a summary statement of the whole status of highway development.

Mr. **Anderson**. Does this census include work that is done on roads other than Federal-aid roads?

Mr. **MacDonald**. Yes, sir.

Mr. **Anderson**. It is an attempt to get at all the road work that is done by anybody.

Mr. **MacDonald**. Yes; by all official agencies. It is an attempt to get a picture of the whole highway situation. In my judgment, it is a very important line of our work, because, as I see the matter now, we have passed from the mere consideration of roads as such, or a local utility, to their relationship as an integral part of transportation. I have been astonished at the results of the Connecticut census taken on the Boston Post Road, which discloses the tremendous variety of commodities going over the highway and the organization that exists already. It is on this particular item that we are relying to develop the information on which we will base not only the regulation of traffic—that, in connection with our physical tests—but also the question of highway financing.

Mr. ANDERSON. Has this study been made at all with any relation to its effect upon railway transportation?

Mr. MACDONALD. No, sir; but I think we ought to carry that out. I went to the Interstate Commerce Commission something over a year ago and asked them if they were making studies of that kind, with the possibility of our cooperating with them, because it seemed that it is the information that we ought to have. They said not, so I made up my mind that the only way we will be able to get it will be to undertake it ourselves in some way.

Mr. ANDERSON. It is a very difficult think to do. We have been trying to get some data on that proposition in connection with some investigation that the joint commission has been making and we have a part of the studies made by different people, all of which are rather unsatisfactory. We tried to get something that we thought would give some fair estimate of the situation, on the average, by having studies made by the railroads and automobile associations and by other people, but they have not been very satisfactory.

Mr. MACDONALD. Mr. Chairman, we have been asked just within the last two or three days to assist in getting some material which I think is for the use of your commission, and we will have available some very definite studies that have been made and for which the material is now being compiled. For example, in the Connecticut census we not only took the number of vehicles and the commodities which they were carrying, but the destinations and the actual weights. We weighed every vehicle at two different times during the season, so that we have data as to the length of haul, the kind of commodity they are carrying, and other full and detailed information. While that does not give you a summary, it does give you for that particular road the possibilities of development that can be applied to other similar conditions. We have very good highway studies in Maryland.

We are cooperating with Maryland in making a study of their traffic over their whole State highway system and we have a traffic map which discloses the traffic carried by the roads of Maryland for the last several years, and also a traffic map of the State of New York that was made by the New York State commission, and a very fair traffic study in the State of California. All those put together will give at least tentative assumptions.

HIGHWAY CONSTRUCTION.

Mr. ANDERSON. The next item is, on page 198, for investigations of the best methods of road making, especially by the use of local materials; for studying the types of mechanical plants and appliances used for road building and maintenance; for studying methods of road repair and maintenance suited to the needs of different localities, and for furnishing expert advice on these subjects.

Mr. MACDONALD. We has asked no increase in this appropriation. We have an apparent increase in the item of $1,560. We are asking no actual increase in this item over last year.

Mr. ANDERSON. I notice in this detail of allotments that you have an allotment here of a certain amount for inspection, advice, and lectures. Will you tell us what that is?

Mr. **MacDonald**. Mr. Chairman, the bureau formerly operated entirely on an advisory basis, and this fund was then very much larger. It was relied upon entirely for the sending of road engineers around the country to assist in building object-lesson roads and giving local communities assistance direct from Washington. The bureau, on the request of the State highway departments and in some cases on the request of the local road officials, sometimes sends a man from our organizations within the States to address State and county meetings, but the use of this fund for that purpose is very limited. The use of the fund is more correctly represented by the investigation of the various types of road constructions and costs. If you will glance back to about 1914 or 1915, the fund was then $145,000. With the establishment of the Federal-aid work we stopped largely that part of our work and a considerable part of the appropriation was cut off. The appropriation for 1922 was $77,000, as compared with $145,000 back in 1915.

Mr. **Anderson**. What are you doing with it now?

Mr. **MacDonald**. We are investigating the best method of road-making, studying types of mechanical appliances used for road maintenance, methods of road repair, and maintenance in the different localities, and furnishing expert advice on these subjects. We are also studying the highway specifications of the various States and endeavoring to improve them, along with our own, for the purpose of revising contracts and specifications.

Mr. **Anderson**. Where are these investigations or studies being made?

Mr. **MacDonald**. I spoke about the studies which we are making in the South—in Virginia, North Carolina, and South Carolina—on sand clay roads. In those cases we are endeavoring to develop a cheap type of road that can hold up under the traffic that has come to those localities. It is not heavy industrial traffic, but, rather, traffic common to an agricultural community. Those studies are being made in connection with State highway departments. For example, the State Highway Department of North Carolina has equipped for us a portable house that we can move from place to place on the highways. We have men who are making studies of individual pieces of road from the time that they were constructed. Mr. Spoon, who is in charge of that work there, originally built some of those roads as object lessons. We are now endeavoring to develop methods which will hold them under the traffic which is tearing them to pieces.

We are endeavoring to develop a method of surface treating of sand, clay, and gravel roads with oil or an asphaltic or bituminous oil that will hold the surface under the automobile and truck traffic. The studies on gravel roads are being conducted in Maine, New Hampshire, and Wisconsin.

COOPERATION WITH FOREST SERVICE IN CONSTRUCTION OF ROADS IN NATIONAL FORESTS.

Mr. **Anderson**. Do you cooperate at all with the Forest Service in the construction of roads in national forests?

Mr. **MacDonald**. We do all of the work for the Forest Service in the national forests of an engineering character. Two types of road are built in the national forests. One type is what may be called the public road. That is, the extensions of the main State or county highways through the forest, necessary particularly for public use, whether that public is without or within the forest. That is what we call the major road program. The Bureau of Public Roads handles all the engineering and all of the supervision of the construction work on that program.

The minor roads and trails which do not require detailed surveys or estimates are built by the Forest Service under its own supervisors and forest rangers. They do much of that work by day labor or force account for the purpose of holding in the forest, laborers to draw on in case of emergency for fire protection. That work does not require a high grade of engineering. But all of the highway engineering work for the Forest Service is handled by the bureau, and in addition to that, all of the superintendence of the major work, which is for the most part let to contract.

EXPERT ADVICE.

Mr. WASON. On page 198 which you have just been talking about I notice this language, "And for furnishing expert advice on these subjects." Now, with that language in there, would you be warranted in sending a representative of your bureau to New Hampshire to address the Good Roads Association at its annual meeting?

Mr. MACDONALD. Yes, sir. We do that under this item in this way: We have in every district representatives of the bureau and generally the man who is our representative in the State will address organizations requesting.

Mr. WASON. Well, it might be that some particular member of the association knew of a man of high ability in a neighboring State—we will say in New York—and requested specially that he come. Under this language would you be authorized, if you saw fit, to allow him to go?

Mr. MACDONALD. Yes; we would be. We answer all calls possible through our organization in the locality or the district. We are often called in by State legislatures for the purpose of advising them in the matter of drafting their laws so that they will coordinate and harmonize with the Federal laws. In such cases we send the best qualified individual, either from the district or the headquarters organization.

Mr. ANDERSON. Are these appropriations that are made for roads and trails in the national forest confined to these county-road systems, or is a part of the appropriation used for the construction of what I suppose they call trails, ordinary forest roads for fire-fighting purposes?

BUILDING OF ROADS AND TRAILS.

Mr. MACDONALD. Under the Federal highway act, November, 1921, the appropriation is divided into two distinct parts, one of which is for the building of roads of primary importance to the State, counties, and communities, and the other part is for the building of roads and trails necessary for the administration, protection, and development of the forests and for the development of resources on which the communities within the forests are dependent.

Mr. **Wason.** Do you happen to remember how the appropriation is divided for the current year?

Mr. **MacDonald.** For the current year the appropriation is divided 50-50.

Mr. **Wason.** What is the amount?

Mr. **MacDonald.** $2,500,000 for each purpose.

Mr. **Wason.** How long has that appropriation been made; how many years? Is this the first year?

Mr. **MacDonald.** That is the appropriation carried by the Federal highway act of November 9, 1921, for the fiscal year 1922. In addition to that, there is an appropriation of $1,000,000 annually, made in 1916, which runs for 10 years, and I am assuming that that appropriation will be divided on about the same basis—about 50-50—this year. The amount available for the next fiscal year is larger, so that there will be a larger percentage available for the public roads.

INVESTIGATION OF CHEMICAL AND PHYSICAL CHARACTER OF ROAD MATERIALS.

Mr. **Anderson.** The next item is on page 199, for investigations of the chemical and physical character of road materials, for conducting laboratory and field experiments, and for studies and investigations in road design, independently or in cooperation with the State highway departments and other agencies.

Mr. **MacDonald.** Mr. Chairman, this is not an appropriation, but simply an authorization. We are asking an increase in the authorization, but whether it is necessary to hold it here or not I am unable to state. It would only be necessary to hold it here as applicable to funds prior to the funds made available under the Federal highway act of November 9, 1921, because in that act this principle has been recognized and that fund can be used for research purposes, research, and administration.

Mr. **Anderson.** When does the money under that act become available?

Mr. **MacDonald.** That money is available now?

Mr. **Anderson.** Do I understand you to mean that this appropriation could be dropped?

Mr. **MacDonald.** This is not an appropriation. This is an authorization to use from the administrative funds——

Mr. **Ball** (interposing). This item does not appear in the tabulation of the department or of the bureau.

Mr. **Anderson.** I understand that, but what I want to know is whether it is necessary to continue to carry this item, if the language in the appropriation under the road act of 1921 gives you both the authority and the money. What is the need of carrying this item?

Mr. **MacDonald.** Will you allow us to take that up with the solicitor. I thought I had touched on that point. If the act of 1921 allows us to use for research purposes funds available before the present act, if that is applicable to all funds it will not be necessary to carry this further.

Mr. **Anderson.** Why should it be, if it is not?

Mr. **Ball.** Because these funds are all set aside and this is out of the 3 per cent overhead.

Mr. ANDERSON. But if you do not spend it for this purpose it goes back to the States, does it not?. If you have enough money in your 1921 Federal aid appropriation to carry this work——

Mr. MACDONALD. We have not, Mr. Chairman. The only chance we have to get money for this work is out of the prior appropriations, because the last appropriation cut down our administration fund to 2½ per cent when we were operating on a 2.7 per cent basis. So that I do not think we are going to be able to save for research work.

Mr. ANDERSON. That is what I am trying to get at. I understood from what you said that if the 1921 appropriation was available for necessary research work, then you did not need this appropriation.

Mr. MACDONALD. No; if the Federal aid act, which recognized this principle, applies to all unexpended balances of the fund so that we can use the fund accumulated prior to that time, then we can drop this item. I am inclined to think we can. It is an amendment to the other act.

NOTE.—The solicitor of the department has ruled informally that this item should be carried in the form submitted.

INVESTIGATION OF SOIL CONDITIONS UNDER SURFACE OF ROADS.

Mr. ANDERSON. Will you explain what you are doing under this item?

Mr. MACDONALD. Under this item we are conducting one of the largest studies that we are making, the investigations of subgrades. That is, we have found that where there are road failures it is not necessarily the question of the failure of the surface of the road, but a question of what soil condition is under the road surface—in other words, the subgrade. Up to the last two or three years, up to the time that the heavy motor trucks became common on our roads, we were inclined to overlook the influence of the soils lying under our road surfaces. Road failures began with the imposition of the heavier loads, and upon investigation we found that many failures were not of the top but of the support of the road surface, so that we have gone into an investigation of the subgrades that coordinates with the work of the Bureau of Soils.

Strange as it may seem, we find that some of the vital facts, to us, are also vital to them. We are, therefore, getting a very considerable amount of assistance in studying the construction of roads from the Bureau of Soils which is studying soil physics and the structure and physical characteristics of the soils. It is peculiar how these matters dovetail together. We carry on the tests both in the field and in the laboratory. The basis of our operation is to construct models on a small scale in the field, semi-laboratory tests. At Arlington we are continually building small sections of road and testing them out with apparatus designed to develop the same blow as a loaded truck delivers to the road. We build a small section of road and then break it up and at the same time study the soil conditions prevailing underneath the road and particularly the matter of the traveling of water. One of the things that we have developed this year is the fact that our roads are never still, that we not only have the expansion and contraction of concrete and brick roads, but also a warping effect. During the heated portion of the day our roads curl down and at night they curl up.

It is a fact that our roads actually lift off of the subgrades by an amount sufficient to disengage them of any support over large areas, and if a heavy truck runs out to the edge of the road surface it usually breaks the surface, because there is no support under it. The movement caused by the cooling of the surface at night, thus warping the road, is so appreciable that an examination along the edge of the road discloses to the naked eye an actual separation; that is, it actually lifts itself clear of the subgrade; and, during the day, it reverses this condition. We are making progress but we are not making fast progress in this matter. We have to begin at the very beginning, because it is a new field and in order to measure many of these effects we have first to develop the measuring apparatus. We may take two years to develop a measuring apparatus to measure some of these effects, and so our progress is not rapid; but we have made more scientific development in road design in the last 2 or 3 years than in the last 20 years, both in this work and in the work we are doing in cooperation with the States.

BUILDING OF TEST ROADS.

In addition to the work we are doing at Arlington, we cooperated in building a test road in the State of Illinois, 2 miles long. The State, in that instance, is carrying a large part of the cost. We are also cooperating in the State of California on what are called the Pittsburgh tests, where an elliptical track was constructed and sections of the roadway were built and were subjected to intensive traffic until destroyed. In that case the money was largely subscribed by outside interests and we obtained the benefit of the observations which we have been making there.

Mr. **Anderson**. Are these tests developing any new methods of construction?

Mr. **MacDonald**. Yes; decidedly so. In this year's specifications we have generally adopted reinforcing for concrete roads, for one thing. A considerable percentage of such roads, built on the ordinary soil subgrades, are now reinforced with steel. That is not so necessary on sandy subgrades and lighter subgrades that are well drained. Another one of the particular developments is the division of the concrete slabs down the center line of the road to allow each side of the road to act independently. That precludes a truck from putting a very heavy stress in the center of the road when the slabs are tipped up.

DISTRIBUTION OF PRESSURE ON ROAD SURFACE.

In addition we are studying the distribution of pressures caused by a load on the surface through the slabs to the subgrades and also are studying the design of bituminous roads. In this we are cooperating with a number of cities to discover the causes of rolling or bunching of asphalt and bituminous pavements under heavy traffic, which has either pressed the asphalt to the sides from the center or pressed it ahead in waves and rolls.

SAND-CLAY AND TOP-SOIL ROADS.

I have already touched upon the investigation of gravel, sand-clay and top-soil roads. We think that if we can develop a cheap method of maintenance of top-soil roads and of gravel roads that it will be one of the very best results we can possibly obtain, because sand-clay and top-soil roads in hot weather will carry heavy traffic. That is true in the South, in the New England States, and through the Mississippi Valley. We can not hold those types by proper maintenance in too dry or too wet weather. We have attempted to put a top bituminous dressing such as oil or tar, only to have it peel up in big flakes, and become worse than before.

If we can hold a bituminous coat ever so thin on top of the sand-clay and gravel surfaces we will be able to carry heavy traffic at a very small part of the cost that it takes to build a concrete or brick and bituminous road. Our biggest problem is a question of holding as many miles as possible of highways in condition for the traffic, and we are attempting to arrive at some other method of doing that, if possible, than by paving all sections. The "washboarding" effect on gravel roads is very pronounced in New Hampshire, Vermont, and Maine, where there is so much summer traffic.

ELIMINATION OF MOISTURE FROM SUBSOIL.

Mr. **Wason**. Right in that connection, are you paying as much attention to the elimination of moisture from the subsoil of the highways as you ought to?

Mr. **MacDonald**. Yes, sir. As a matter of fact, when you get into the question of soils, some soils will hold more moisture than can possibly be taken out except by drying in a hot oven; that is, some soils will hold enough moisture so that no amount of tile drainage, or any other method of superficial removal of moisture now used, will hold that soil under heavy traffic.

Mr. **Anderson**. Well, can you keep water from running off the top of the soil?

Mr. **MacDonald**. Mr. Chairman, our roads that have a concrete surface accumulate more moisture immediately under this surface than dirt roads do, without any top on them. I should like to have the privilege of taking the members of this committee over to Arlington and pointing out all of the inconsistencies that we have discovered. We put a top on the road to keep the moisture off the top of the road only to find that immediately it will pond underneath, but we are not nonplussed by the matter. We have been able to explain these phenomena and we are gradually being led into a solution of the problems of road drainage.

Mr. **Anderson**. You mean that is true in a road that is well drained on both sides so that the moisture has got to come up from underneath?

Mr. **MacDonald**. Yes, sir. Of course, I would not want to say that as applying to an extreme case, such as in the spring of the year when your roads are soaked and full of moisture from constant rains. Under those circumstances the probabilities are that a dirt road would accumulate more moisture, but during the ordinary time of the year if the concrete road and the dirt road are each dry on top there will probably be a greater percentage of moisture 6 or 7 inches down under the concrete.

Mr. **Anderson**. But nobody cares how much the moisture is under the road when the road is dry on top. The question is, how much moisture is on the top of the road when the dirt is wet on top?

Mr. **MacDonald**. I am talking about the concrete slabs.

Mr. **Anderson**. I am talking about about dirt roads and draining them.

Mr. **MacDonald**. We are insisting on all the different kinds of draining there are, but we have come to this conclusion, that until we do something more than tile draining or constructing ditches on either side of the road we can not drain the heavy soils sufficiently to make them good supports for a surface of another kind or for an earth road, as such. The soils include the clay, the adobe, and the black wax soils, all of which are hard to deal with in road maintenance and road building. I am not talking about the light sandy soils or soils which do not have a high colloidal content.

Now this, Mr. Chairman, answers your question from the standpoint of research matters in soils work. From the standpoint of road designs and the removal of the water in a primary way, we have insisted on adequate side ditches first of all, and adequate openings under the road. We examine every mile of road that is built. We examine every plan for every mile of road in detail, and we have insisted on including a sufficient number of openings to remove the water as fast as possible from the roads. I had in mind that your question referred more particularly to research work from which we are trying to learn about the different kinds of soils over which we build roads. This is the biggest question with highway engineers to-day, particularly as to their supporting power.

Mr. **Anderson**. I suppose everybody who has been in that part of the country (the Mississippi Valley States) knows that there are places where you can take this clay and mold a round ball of it and it will bake on the outside and hold the moisture for a long time. Unquestionably that is true, and I suppose the problem of draining roads of that kind is very much greater than in other kinds of roads. But what was disturbing me was that my interpretation of what you said was that there was no use any more of even trying to drain roads.

Mr. **MacDonald**. No, sir. I intended to say that with many soils there would still be sufficient moisture held in them after ordinary drainage to render them unreliable supports for the road. This is particularly true of the adobe, black wax, and heavy clay soils.

Mr. **Anderson**. I know there are some roads in Minnesota where, in the spring of the year, you can drive over the road with a perfectly dry surface on top, but it will be just like waves underneath, as if it was made of rubber.

Mr. **MacDonald**. Even though there were adequate side ditches on the sides?

Mr. **Anderson**. Yes.

Mr. **MacDonald**. Mr. Chairman, I do not wish to allow to creep into the record anything that would suggest a neglect during construction of ample side ditches, road crowns, and openings under the highways. I believe in tile draining, although a good many engineers are opposed to putting tile drains under the roads.

Mr. ANDERSON. I am inclined to think that a tile drain will not drain a road with a soil content that will not carry off the moisture.

Mr. MACDONALD. Yes; that is it. My testimony would be much easier to understand if the committee could find it possible to look over some of the experimental work at Arlington. Under this item, in addition to the other research work, we have the routine testing of materials, testing of new supplies or materials for the Federal-aid work. The entire appropriation comes from the administrative funds of the Federal aid road act.

ADMINISTRATION EXPENSES.

Mr. BUCHANAN. What percentage of that fund is devoted to administrative purposes?

Mr. MACDONALD. Formerly it was 3 per cent, but now it is 2½ per cent. It should be returned to 3 per cent.

Mr. BUCHANAN. Now, if 2½ per cent is sufficient, suppose that act authorizes you to conduct some character of investigation that is covered in this item in the appropriation bill. What use have you for this item at all in the appropriation bill?

Mr. MACDONALD. That was the same question that the chairman asked a few moments ago.

Mr. BUCHANAN. And your reply was that by reducing your percentage for administration, 2½ per cent would not be sufficient?

Mr. BALL. Unless it was made retroactive.

Mr. BUCHANAN. But this does not make it retroactive. This is payable out of Federal aid funds, as amended.

Mr. ANDERSON. It would apply to the original funds.

Mr. BALL. But this refers to the amendment.

Mr. BUCHANAN. It says, "payable out of the administrative fund provided by the Federal aid road act of July 11, 1916, as amended." That is provided by the act.

Mr. BALL. But this was written before this amendment that he is talking about was passed, and unless it gets part of the appropriation out of the old appropriation under the original act, then this appropriation will contravene or modify the last amended act we passed on goods roads, because it will make a larger allotment out of that fund than could be derived from the 2½ per cent.

Mr. BUCHANAN. Yes; but you are going to run up against the Comptroller General in the wording of your appropriation—"payable out of the administrative fund provided by the Federal aid road act of July 11, 1916, as amended."

Mr. BALL. It probably means as amended by a certain other date.

Mr. BUCHANAN. It ought to be "payable out of the act of July 11, 1916," and stop right there.

Mr. BALL. That would only give us the balance out of the first appropriation.

Mr. BUCHANAN. That would give you $175,000 out of the first appropriation and whatever was provided by the amended act.

Mr. BALL. But if you left off the words "as amended," it would not.

Mr. MACDONALD. We may be able to leave this item out entirely. That act was not passed when this was written.

Mr. ANDERSON. I think you had better put that question up to the solicitor.

Mr. MACDONALD. All right.

(NOTE.—The solicitor holds that this item should be retained.)

FOR MAINTENANCE AND REPAIRS OF EXPERIMENTAL HIGHWAYS.

Mr. ANDERSON. The next item is, on page 200, for maintenance and repairs of experimental highways, including the purchase of materials and equipment, for the employment of assistants and labor. There is an apparent decrease of $5,000.

Mr. MACDONALD. The use of that item is for the maintenance of certain experimental highways that were built—or portions of those highways—that were built with the appropriation. It was constant at about $60,000 from 1915 to 1920. We are still maintaining some sections of those highways and making studies of them, but we have decreased the request this year to $20,000. It was $25,000 last year—1921 and 1922.

EXPERIMENTAL ROADS, CHEVY CHASE AND MOUNT VERNON.

Mr. WASON. Where are some of these experimental highways?

Mr. MACDONALD. One section extends in Maryland from the circle out to Chevy Chase Lake. We have a series of short sections there of different types of roads that we are maintaining. There is one section of bituminous road that runs through Bradley Lane. The rest are on the road between here and Mount Vernon. That is the Mount Vernon Road.

Mr. PUGSLEY. Are you duplicating those tests in other sections on different types of soil?

Mr. MACDONALD. No; we are not duplicating these same tests in other sections, but we are using the same types of roads in our major operations now. That is, the information that we get from the short sections has been used in the development of specifications for major road construction, so in that sense we are not duplicating the experiments, because we hope that the information that we have received from these experiments is really beyond the experimental stage now, and that we have developed specifications that we are reasonably sure of.

Mr. PUGSLEY. The question in my mind which prompted the inquiry was this: The soils in different sections of the country are entirely different, and I was wondering whether that would not have something to do with the result of the tests—the result that you secure from the experiments.

Mr. MACDONALD. Yes; it would have a very material effect; it would make a very material difference.

Mr. PUGSLEY. So that perhaps a type of road which really stood up well on the top soil here would not stand up well on the top soil in the Mississippi Valley or in some other section of the country?

Mr. MACDONALD. It might need auxiliary construction of some kind, but as a general statement it is true that types of roads which would stand up on types of soil here would not stand up on some of the soils in the Mississippi Valley.

Mr. **Anderson.** That would be due to weather conditions, to the frost and other factors.

Mr. **MacDonald.** There are a good many other factors besides the soils; yes, sir.

Mr. **Anderson.** Are you contributing anything to the maintenance of these roads?

Mr. **MacDonald.** Those particular roads we are maintaining in their entirety. We have been gradually giving them over to the maintenance of the State or counties. That is, we are only maintaining short sections now where we formerly maintained roads in their entirety. For example, the road to Rockville was built as an experimental road some years ago and that has been taken over by the State and is now being maintained entirely by the State.

Mr. **Lee.** Where is that experimental road where you have experimental sections about 100 yards long?

Mr. **MacDonald.** That is the one from Chevy Chase Circle out.

Mr. **Lee.** And then on beyond Chevy Chase?

Mr. **MacDonald.** Yes, to the lake, also through Bradley Lane. Those highways, while they do not appear so without close examination, are composed of short sections of different types of construction.

Mr. **Anderson.** I will call your attention, Mr. MacDonald, to this detail of allotments on page 145 of your statement here. Your estimates for the current year show $10,500 for maintenance and $6,000 for miscellaneous, while the estimates for the next fiscal year do not include anything for maintenance but include $16,500 for miscellaneous items.

Mr. **MacDonald.** The appropriation is for just the same work.

Mr. **Anderson.** Do you mean that the maintenance and miscellaneous items have been lumped together in the item for $16,500?

Mr. **MacDonald.** Yes, sir. We are not contemplating any new work, any additional work, or any different work, under that item, with the exception of the repair of sections of roads which we actually break up under tests. We are going to make some tests of short sections of road on the main traveled highways.

Mr. **Anderson.** In the vicinity of Washington?

Mr. **MacDonald.** Yes. However, that would be a small item.

Mr. **Anderson.** I was hoping we would get rid of this item pretty soon.

Mr. **MacDonald.** Mr. Chairman, I think we ought to maintain the road going into Mount Vernon. Otherwise I do not know how that road will be maintained. If necessary, we will give up all the rest, but I do not see how that road will be maintained if we do not do it.

Mr. **Anderson.** I think probably you are right about that.

Mr. **Pugsley.** Is not there an experimental value to continue the maintenance of these roads? You are keeping a record of the cost of maintenance?

Mr. **MacDonald.** Yes. There is an experimental value to it, but we have got to the point now where perhaps in another year or so we will either have to rebuild; that is, we will have to ask for enough money to resurface and rebuild these sections or else give up the maintenance entirely. This work has been conducted for a long time and we have about finished with the experimental or informational data that we can get. We either ought to ask for enough money to rebuild them or else give them up entirely.

Mr. **Anderson**. That is exactly the impression that I had about it. They have been down a long time and it is now a matter very largely of whether they are to be maintained in the future by the Federal Government or by anybody else; and while I think there is some reason for maintaining the road out to Mount Vernon, there does not seem to be so very much reason, from a maintenance point of view, for maintaining these other roads. For instance, that Bradley Road was resurfaced last year, was it not?

Mr. **MacDonald**. The maintenance treatment is hardly what we would call resurfacing. It was an oil treatment—rather cheap treatment. I served notice on those people some time ago that if they would not make provision for getting the road widened so that it was a safe road, we would not maintain it any longer. I think it is an unsafe road, and I am afraid there will be an accident there for which we will be more or less responsible. It is only 15 feet wide.

Mr. **Anderson**. I know it is very narrow.

Mr. **MacDonald**. But I am not insistent on the carrying on of that work very much longer. We have better data on those roads than we have for any other roads. I consider it a national responsibility to maintain the road into Mount Vernon.

Mr. **Anderson**. How much of that road is there?

Mr. **MacDonald**. It is not over a couple of miles. I have forgotten how long it is

Mr. **Anderson**. What does it cost to maintain that road?

Mr. **MacDonald**. I can not tell you. I will put that in the record.

Note.—For new construction and repairs about $3,000.

FOR INVESTIGATING AND REPORTING ON WATER UTILIZATION IN FARM IRRIGATION.

Mr. **Anderson**. The next item is on page 201 for investigating and reporting certain questions of irrigation, $72,000.

Mr. **MacDonald**. Mr. Chairman, I touched on the outlines of this work yesterday, the large fields that are occupied. I would like to bring before the committee the thought that we want to get all this work on a basis that will meet the favor of the committee so that we will be allowed to expand it. I believe that agricultural engineering is one of the big forces, one of the utility services, that will do a great deal toward the betterment of the agricultural population. We are very desirous of getting our work largely on a research basis and a cooperative basis that will produce results that are sufficiently important so that the committee will see its way clear to enlarge this work. In the appropriation this year we are asking a very modest enlargement of one of the items, and in other two we have asked no increased appropriation.

I would like to have Mr. McCrory make a statement. He is Chief of the Agricultural Division, and I would like to have him make something of a detailed statement as to these three items.

Mr. **Anderson**. I will be very glad to have him make a statement. Before he commences I would like to say that I had hoped that the fiscal situation would be such as to permit of an expansion of the work under a number of these departments, as well as the civil services in other departments of the Government. Apparently the present status is about this, that since 1916, with the reductions that have been made and are contemplated this year, the appropriations for the civil services of the Government will be somewhere between 10 and 15 per cent above the 1916 level. Now, that is very much less than the normal rate of increase in the years preceding 1916. I felt that we ought pretty soon to get to a point where there will be some expansion of the civil services of the Government, which have such a very close relation to the economic life of the people. I am afraid we have not reached that point quite yet, although I wish we had.

Mr. MacDonald. We recognize that situation; and as I stated, Mr. Chairman, what we are trying to do, however, is to put our work on such a basis of service that when the time does come we will be able to expand, with the assistance of this committee, along the lines that permit of returns to the people consistent with the expenditures.

The agricultural engineering field has widened materially with the development of the use of farm machinery on such a large basis and the equipment of farms and homes. I would like to have Mr. McCrory make a statement.

Mr. McCrory. Mr. Chairman, there is no change in the wording of the item on page 202 for the present year. The language of this clause which provides for the irrigation work has not been changed for a number of years. In recent years there has been a considerable reduction in the amount of work, due to decreased appropriations and increased cost of operation.

The work that the irrigation division is doing can be divided into three parts, as follows:

1. That dealing with the problems of the farmer on his own farm.
2. That dealing with the engineering phases of the building of works and the conveyance and measurement of water.
3. That dealing with public, community, and institutional phases of irrigation.

The allotment of the funds to these lines of work I have tabulated here as follows [reading]:

	Amount.	Per cent.
General supervision	$4,200	6
Farm irrigation problems	32,300	45
Engineering investigations	26,500	37
Public and organization problems	6,000	8
Extension	3,000	4
Total appropriation	72,000	100

We have had very good cooperation in this work from the Western States. Under the agreement with California we are receiving from the State $7,000. From the State of Texas we are receiving $2,580; from Colorado, $4,720; from Nevada, $3,000; from New Mexico, $2,900; and from Utah, $4,000.

There is a popular impression that irrigation consists principally in the building of works to bring water to the land to be watered.

and statistics of irrigation show the cost of irrigation works as if this were the main item. Recently we made an investigation of one of the large Government projects, the Newlands project. That investigation showed that there had been expended by the Government in construction about $7,000,000, and that with only one-fourth of the land of the project actually watered the farmers had made an investment of about $9,000,000 in improvements, in preparing their land for irrigation, etc.

Mr. **Anderson.** What do you mean by preparing land for irrigation?

Mr. **McCrory.** Leveling it and clearing off the undergrowth, the sage brush, and that sort of thing; digging farm laterals and farm irrigation ditches.

From this it is apparent that, measured by cost, the things remaining to be done by the farmer after the water has been brought to the land are of far greater importance than the works supplying the water. The safety of the whole investment in supplying water and in establishing and equipping farms depends to a large extent on the proper use of the water after it has reached the farms, and that is one of the fields for the work that the division is doing.

Mr. **Buchanan.** Do you have any idea how much that investment amounts to? Have you any idea how much, as to supplying water and establishing and equipping farms, is included in that?

Mr. **McCrory.** I can not give you that figure offhand. I can insert it in the record if you would like me to.

Mr. **Buchanan.** All right.

The last census shows $697,657,328 invested in irrigation enterprises in the United States. The report from which this figure is taken does not show the cost of preparing land. The report of the census of 1910 shows the average cost per acre for supplying water to have been just about the same amount as the average cost of clearing, leveling, and ditching farm land to get it ready to be irrigated. It is probable that the same condition existed in 1920. Prices were higher in 1920, but probably they affected both items in the same degree. This cost does not include buildings, fences, equipment, and live stock. It covers merely the work made necessary because the land is to be irrigated.

Mr. **McCrory.** The determination of the quantity of water to be applied to various crops, the development of the best methods of applying water to the various crops and soils, and the securing of the adoption of these methods by the farmers, is an important part of our work. The use of too much water will ruin the best of land; and attempts to irrigate poorly prepared fields will result in poor crops, as well as injury to the land. In either case, the result will be the failure of the farmer, and through his failure, the failure of the enterprise supplying water.

A large part of the work of this division in the past has been the carrying on of experiments to determine what we have called the "duty of water"—that is, the quantity of water that should be applied to the different crops under various soil and climatic conditions. We have now in publication a report of such investigations running through several years in the Salt River Valley, Ariz. Similar reports for other sections have been published.

After we have determined how much water should be applied there remain the purely mechanical questions of how to apply the water to the fields to get it to the plant roots as it is needed, with the least possible labor and expense, and waste of water. This involves careful experimentation; and after we have determined the best method, it is necessary to demonstrate it and show the farmers how to use the method. We have just completed a series of experiments on methods on border irrigation, and that is being published now as a farmers' bulletin.

The engineering problems handled are of two classes, the general broad engineering problems that apply to the whole irrigation field, and local problems.

One subject to which we have given much attention is the carrying capacities of irrigation ditches of various construction and alignings, and of pipes and siphons. We have made investigations on wood pipe, concrete pipe, and metal pipe. These reports have been adopted, you might say, as standards throughout the country, and we get a great many demands from foreign countries for that sort of information. Installation of too small a channel or pipe means a shortage of water. The installing of too large a pipe or canal means a waste, because of unnecessary expense.

A necessary preliminary to the use of the proper quantities of water is the measurement of the water. Measurement is necessary also for the distribution of water to those entitled to it.

The large quantities of water used and the conditions under which it must be measured preclude the use of ordinary measuring devices. We have been working on measuring devices of different characters for a number of years, in cooperation with the Colorado Experiment Station, in connection with which a hydraulic laboratory has been maintained for this particular line of work and other technical investigations. We have made a good deal of progress in this field, and a number of measuring devices that have been quite widely adopted, have been developed there.

A large part of the water used in irrigation is carried in open ditches, and the losses from these ditches are very large. These losses are serious, for two reasons—they decrease the amount of water that may be used for useful irrigation and they injure large areas of valuable land.

Concrete pipe has been much used for conveying water for irrigation purposes, and that cuts down the losses of water to a great extent. We have been cooperating in the State of California with the manufacturers of concrete pipe in a study of the methods of manufacturing and to determine how the quality of the pipe could be improved. A very thorough standardization and a great improvement in the quality of the pipe has been accomplished in California as the result of these investigations, and as the result of the work in California the pipe manufacturers in other States are adopting the California methods.

One of the interesting things that the last census brought out was the very great increase in the amount of land watered by pumping. There were about a million and a half acres in 1919 irrigated by water lifted with pumps. This development of pumping has created a large demand for information regarding pumps and wells. We have been conducting a number of investigations with regard to pumping and with regard to wells. The results of these investigations have been used in demonstration and are now being prepared for publication as departmental bulletins.

Another very important investigation that we have had in progress for several years past has been a study of the return seepage on the South Platte River in Colorado. This investigation has a general value as showing the probable water supply from streams of this sort from this source generally, and it has a great local value in aiding in the distribution of water from the stream and pointing out the possibility of future extension of the irrigated area.

A report of this investigation is now in process of being printed. Originally the South Platte was a typical mountain stream, losing in its course across the plains the water coming from the melting snows in the mountains. Its waters were lost near its source. Irrigation began near the foothills, but there was still a large loss of water in the spring and from floods.

The storage facilities were increased; and the return water from the seepage, when it was used for irrigation, extended the flow of the stream farther down. In 1919 the water made available by this return flow, at a conservative estimate, was worth about $1,500,000 to the farmers of the State of Colorado.

Arrangements had been made to extend that work to the Arkansas River last spring, when the Pueblo flood washed out so many structures and did so much damage that we were forced to abandon the investigation until a later date.

The drainage work in the West is also handled by this division. That work relates principally to the drainage of irrigated lands. About a million and a half acres of irrigated lands have been drained since the work of draining irrigated lands was started in 1903. Returns from the census indicate that in 1919 there was about a million and a half acres more that needed drainage at that time. The drainage problems in the West are quite different from those in the East; they are very complicated and require a rather unusual training to secure the best results.

The bureau has also been cooperating with the Water Users' Association in the Salt River Valley of Arizona in experiments in drainage by means of pumping. The association installed a large number of wells and pumping plants on lands that were suffering from a high-water table. The bureau kept records of the rise and fall in the underground water level, of the amounts pumped, and so forth. The results of this investigation have been quite instructive, and indicate that it will be possible to control the ground water level in that valley, and thus secure drainage by means of pumping from these wells much cheaper than it could be done by open ditches. The water taken from the wells can be used again for irrigation. Some of it is alkaline and will have to be mixed with other waters; some of it is usable, however, just as it is taken from the wells.

We have also done, in the irrigation division, considerable work which combines engineering and institutional problems. In the process of development of the West irrigation projects were established which conflicted more or less in their interests, and as the development has progressed the conflict in regard to water supplies becomes greater and the problem of securing an ample supply becomes more difficult. Our engineers have been called on in a number of such instances to investigate the possibilities of obtaining the added water supply needed, and also to devise means by which the parties who are to use the water can work together. Within the past year we have made two such investigations in Utah and submitted reports to the local parties. In both cases we found that there was an ample supply of water available for the land which was not now getting sufficient water, and also that the additional water could be made available, which would cover quite large areas of land which is not now receiving any water. This, I think, is one of the most important lines of work that the division has been conducting recently. The engineers of the Federal Government seem to be able to harmonize conflicting interests better, possibly, than local engineers.

One of the most pressing institutional problems in connection with irrigation work in the West is the problem of financing the irrigation enterprises. The question is, first, how to get money for construction; and, second, how to get the construction costs repaid by those who use the water. This involves the whole subject of organization.

The division of the areas irrigated and in enterprises among public and private agencies is shown by the charts which Mr. MacDonald showed you yesterday. A little more than one-third of the irrigated area is supplied with water by individual and partnership enterprises, which involve no organization for financing. Another third is supplied by cooperative enterprises. These represent largely reorganizations for controlling and operating enterprises established by other agencies. The remaining 30 per cent of the area is served by enterprises of the classes that are engaged in the construction of new works.

The bureau has been making a study of their operations, and has now about finished a report on irrigation districts. You will recall that we showed you yesterday a map showing the wide distribution of irrigation districts over the western part of the country.

Under State irrigation district laws, bonds are issued to secure funds for construction, and are a lien on the land in the district. The districts have the power of a quasi-public corporation, and have the right of eminent domain, and, too, can do a great many things that the old organizations could not do. You all know, perhaps, that investors throughout the country have lost large sums of money because of lack of full and reliable information regarding bonds issued for the construction of irrigation works, and a type of organization should be developed which will permit of the financing in such a manner that expansion can be made as it is needed, and so as to protect the public against investments that are not properly secured; and the irrigation district seems to supply this need better than anything else.

That covers, in general, the principal lines of work—general work—that we are carrying on with respect to irrigation.

In Arizona we are making a report on the proper quantity of water to use in the Salt River Valley, which has been submitted for publication.

Also a report on the use of deep wells for draining irrigated lands has been submitted for publication.

In California we are conducting investigations as to irrigation practice in deciduous orchards, and also as to the amount of water required and methods of application.

Much attention has also been given in California to determining the possibilities of improving the water supplies of communities and helping them to organize for the purpose of providing storage. By communities I mean rural communities, not towns.

In Colorado we have been cooperating with the Colorado Agricultural College. Nine years ago they built a hydraulic laboratory, and since then we have been cooperating with the college in operating this laboratory, and have published a number of studies on various technical subjects which have been well received by irrigation engineers. We have in press a report on irrigation in northern Colorado which is valuable, because there community action in controlling a whole river system has gone further than anywhere else in the United States.

In Idaho we have been working on the drainage of irrigated lands for a number of years, and most of our work there has been in developing plans for drainage. We are now giving some attention to improved methods of preparing lands and supplying water.

Montana has been included in some of the general studies referred to previously, and some assistance has been given in the drainage of irrigated lands.

In Nevada we have been making studies looking to the improvement of irrigation practice; also to the introduction of measuring devices for the purpose of avoiding controversies and litigation over water. We are also giving assistance in installing small pumping plants, and in the organization of drainage districts.

In New Mexico the most acute need at the present time is the drainage of damaged lands. A large part of the land of the Rio Grande and Pecos Valleys is becoming water-logged. A number of districts have been organized in the State, and the work is going ahead quite rapidly.

In South Dakota and Oklahoma we have been doing some work in semiarid sections, in small irrigation projects.

In Oregon we have done a great deal recently, and have given some attention to drainage in the humid section of the State.

In Texas our main work has been the making of experiments to determine the proper quantities of water to use in irrigating the crops grown in that State. This work has been concluded, and we are now taking up there the study of the loss of water from canals and its prevention, for the purpose of saving water and preventing the water-logging of land.

In Utah the principal line of work has been in assisting the older communities to organize for the purpose of securing funds for storing flood water, and in locating available reservoir sites. We have also assisted communities where stream water is not available, to determine the possibilities of securing a water supply from wells.

Mr. ANDERSON. Let me ask you, is it necessary, for irrigation, that the land to be irrigated should be rendered level?

Mr. McCRORY. Yes. In order to get the water on uniformly, the land must be at least nearly level. It depends on the method of irrigation, how the land should be prepared; but the slope of the land must at least be uniform. If they are using an ordinary method of irrigation, it is desirable that the checks in which the water is placed should be level, so that it can be placed to a uniform depth. If it is furrow irrigation, the land should have a uniform slope so that the water will travel down the furrows at about a uniform rate of speed, and reach the lower end of the field at about the same time, so that they can get the water there fairly uniformly.

Mr. ANDERSON. Where is this division's headquarters?

Mr. McCRORY. At Berkeley, Calif., for more uniform control of the work centered in the West.

Mr. MACDONALD. Our men maintain the work in cooperation with the colleges over the West.

Mr. McCRORY. The men are scattered widely over the West. That is all I have to say on this item.

FARM DRAINAGE AND DRAINAGE OF SWAMP AND WET LANDS.

Mr. ANDERSON. Are there any questions? If not, the next item is on page 202:

> For investigating and reporting upon farm drainage and upon the drainage of swamp and other wet lands.

And so forth.

Mr. McCRORY. No change is made in the wording of the clause providing for drainage work. The work of the drainage division is divided into three classes, supervision, research, and extension. The total appropriation for the work for the coming year is $72,260. There is an apparent decrease of $1,500 there, due to the transfer of one clerk at $1,500 to the statutory roll.

We propose to devote $4,500 to supervision, $47,260 to research, and $20,500 to extension work. That is, 29 per cent of the money is devoted to extension work.

Mr. MACDONALD. In irrigation and drainage we are attempting to go into the research field to the exclusion of most other work; that is, to do as little extension work as possible, and to allow the extension work to be done by the other agencies, either State or national, supplying for their use data from the researches of our engineers.

Mr. McCRORY. The exact quantity of water that a tile drain or a drainage ditch may be called upon to handle is a matter that greatly affects the economy and efficiency of drainage installations. If drains are made too large, money is wasted. If they are made too small, their efficiency is impaired; the farmer who puts them in loses money. The difference in cost, for example, as between 24-inch and 30-inch tile drain in place is approximately $5,000 per mile.

Mr. ANDERSON. $5,000?

Mr. McCRORY. $5,000 per mile. Several years ago we made a study of the hydraulic factors involved in the flow in drain tile. Last year we carried on investigations in several districts in southwest Minnesota, to determine the amount of water that was carried away by tile drains, and to determine whether or not the coefficients that we had worked out by laboratory methods were applicable to field conditions. A great deal of valuable data with regard to flow in drain tile was secured, which will be of service to all engineers engaged in the designing of tile drains. We found that the work which we had done in the laboratory applied very closely to field conditions.

We secured, also, in that investigation a considerable amount of information in regard to the amount of water actually removed by tile drains. Iowa has spent probably $40,000,000 on tile drains, and

Minnesota has spent a very large amount on tile drains in recent years; but so far as I know, this was the first attempt to find out what large drains were doing. It sounds very easy to get out and measure the flow of tile drains, but we had considerable difficulty in finding a place where we could carry on these investigations. We finally found three or four large drains in southwestern Minnesota, near Slayton, where conditions were such that we could get a weir in at the outlet of the drain, and make actual measurements of the flow; and that data is going to prove of great value to all engineers engaged in constructing large tile drains. It will permit them to plan their drains more accurately than they have in the past.

Mr. Anderson. Let me ask you, will that data have applicability elsewhere?

Mr. McCrory. Yes; in a general way it will be applicable; the hydraulic part of it will be applicable to any tile drain. The data in regard to the amount of water removed is not so applicable; but still, as a guide, it is very valuable in aiding the judgment of the engineers who are designing tile drains.

Mr. Wason. Did this investigation disclose the fact whether the capacity of the tiles used was larger than necessary, or anything like that?

Mr. McCrory. Some of them were too large and some were too small. It brought out one thing that was rather interesting; that was that the water came to the drain very much more quickly than we had thought possible before.

Mr. Wason. Do you mean by that the flow of water?

Mr. McCrory. That the water came to the drain through the soil very much more rapidly than had been thought. As I recall the experiments, in about six hours after the heaviest rain the water in the tile would begin to rise very rapidly.

Another line of research to which we have been giving considerable study is the effect of tile drains upon the water table in different soils. The purpose of this investigation is to acquire data for determining the most economical depths and spacing of drains in various soils. At the present time our knowledge in regard to this is not as broad as it should be. We have been carrying on these investigations in a number of the Southern States during the past year.

The problem of silting up of dredged drainage ditches is a matter that is engaging the attention of engineers and landowners throughout the United States. The material which fills these ditches is washed from the hillsides and the ditch bank, and so far there have been worked out no practical means for preventing this difficulty. The cost of maintenance in some sections of the country is a very serious problem. The efficiency of some ditches that we measured in Mississippi a few years ago was decreased about 50 per cent by growth of willows that had taken place in about three years.

Mr. Anderson. Tell us a little more about that? I am afraid we do not get it. At least I do not. I do not understand just what you mean when you say that the tile efficiency——

Mr. McCrory. Not tile. I was speaking of the efficiency of open ditches. There was a growth of willows in the open ditch which in three years decreased the carrying capacity of the channel about 50 per cent. We have had other cases where the decrease in capacity was even greater.

One method of keeping the silt out of the streams is by the use of sedimentation basins, placed at a point where there is a break in the slope. Where a ditch comes down out of the hills and goes on to the flat land, silt, sand, and gravel, and all sorts of débris is deposited and in some instances a small stream has been known to completely fill a new ditch in one night, causing a loss of a good many thousands of dollars. One way to prevent this is by the use of sedimentation or settling basins which will take the silt and other material out of the water.

We have begun an investigation of the factors affecting the design and construction of these basins, and have been working on that for the past two years. We are securing a lot of valuable data and learning a good deal about the possibilities of these basins and the condition where they are of value.

The durability of concrete tile when used in soils containing alkalis and acids is a matter of considerable interest in a large number of States. Several years ago that problem came up in the Northwest, and we began an investigation about three years ago to determine what was causing the difficulty, how general the condition was, and what could be done to prevent the trouble. Our investigations have shown that magnesium sulphate is probably the direct cause of the trouble. A very careful examination of field conditions was made in southern Minnesota and in parts of Iowa, and we have been able to delimit the area in which such action is apt to occur. We find that there is little probability of trouble in Iowa, and that in southeastern Minnesota the conditions are such that concrete tile can be used satisfactorily.

At the present time, in cooperation with the University of Minnesota and the department of drainage and waters of the State, we are continuing these investigations. The State appropriated $5,000 per year for two years for this work. We are now endeavoring to improve the quality of the concrete tile manufactured in the State. It would seem that it should be an easy matter to make a good concrete tile, but tests of a number of tiles from the different factories disclose a very wide range in the quality of the tile. By better grading of the materials used in the manufacture of the tile, and by better curing, it is possible to greatly increase the strength and reduce the absorption of the concrete in the tile, which makes it more resistant to the alkalis. It might be of interest to the committee to know that the tile makers in Minnesota are cooperating very cordially with us in this work. When we first started, they felt that we were going to do them a great deal of injury. They now realize that instead of being an injury, it is being of very great assistance to them in solving problems that they had not worked out before.

At the request of engineers, district officials, or landowners, we give advice as to whether it is safe to use concrete tile in sections where the alkalis are known to be present. This service has been of great assistance to the officials of the drainage districts. Generally there is a very bitter fight as to the material to be used. Concrete in many instances is cheaper and they would like to use it if possible, but they like to know what the risk is before they decide. From our investigations we are able to predict quite closely what the probable result will be when concrete tile is exposed to the action of waters containing known quantities of sulphate for a given period.

Mr. Anderson. What do they use when they can not use concrete?

Mr. McCrory. They have to use clay. It is very desirable to keep the concrete tile industry going, because prior to a year ago the clay and concrete plants together could not meet the demands.

The gullying of farm lands is one of the serious problems of the farmer in many parts of the country, as is also the matter of surface erosion of farm lands. We have been doing a good deal of work on that for a number of years. During the last fiscal year we have assisted Ohio and Indiana in starting the first terracing work for the purpose of controlling erosion on their farm lands, and have also prepared a manuscript of a farmers' bulletin on the control of gullying on farm lands, which should be of much service to the farmers throughout the United States.

Mr. Lee. Is that on the same principle they have been doing terracing in the South for about 10 years?

Mr. McCrory. Yes; they make a succession of terraces on the slope.

Then we are using other methods for controlling gullies which are larger than the terrace will control.

Mr. Anderson. In this terracing work you also get more conservation of the water and soil?

Mr. McCrory. Yes; to a certain extent. It holds the water on the soil a little longer, and there is possibly more water absorbed. The greatest advantage is that the water runs off slowly in a broad sheet. In some of the heavy soils we have found it necessary to place a tile drain above the terrace if the best results are to be secured.

One rather interesting development in drainage work in the last few years has been the designing of channels too small for the expected flow of the stream, and allowing them to enlarge by erosion. That practice has become quite common in the Missouri Valley, particularly in Nebraska, Missouri, and Iowa, and we have been making a rather interesting series of investigations to determine the conditions under which ditches do enlarge. We have found that if the ditch is to enlarge successfully, it is essential that the ditch be made a little deeper than the natural stream which we are improving. If that condition obtains, in certain soils, a rather regular rate of enlargement occurs; but if the old channel of the stream is deeper than the new ditch, the water insists on following the old channel, and it is rather exceptional when you can get one of the shallow ditches to enlarge.

Our extension work in farm drainage has been carried out almost entirely in cooperation with the extension services of the various States. The need for the extension work has been particularly urgent in the South in the past few years, but the colleges are building up that work, and we are withdrawing from that work as rapidly as we can without losing part of the ground that has already been gained. This concludes my statement on farm drainage.

INVESTIGATIONS OF FARM-ENGINEERING PROBLEMS.

Mr. **Anderson.** Then we will take up the item on page 204, farm-engineering problems. You have some change there in the wording.

Mr. **McCrory.** There is suggested a change in the wording of the act. It provides no new authority, but it defines more clearly the work which it is proposed to do.

There is an apparent increase in this item of $23,000 over the present appropriation, $8,000 of which has been transferred from the item for fruits and vegetables, Bureau of Agricultural Economics, making the amount of the increase $15,000.

The $8,000 transferred from the Bureau of Agricultural Economics will be used in investigating engineering problems relating to handling, storage, and transportation of fruits and vegetables, this being a part of the procedure involved in gathering all the engineering work in the department into one bureau.

In this work there is an error in the table showing employees in 1923. It is expected that two engineers will be transferred from the Bureau of Markets and that a structural engineer and a junior engineer will be employed, and also a much-needed mechanical draftsman—that is contingent on the increase being granted—and that the services of two new draftsmen for a portion of the year when they are most needed will be secured. On this basis the probable expenditures from the appropriation for salaries, traveling expenses, equipment, and supplies will be as shown in this table which I present for insertion in the record. It is as follows:

Employees, 1923.

1 chief of division (part time)	$2,270
1 architect	3,500
1 agricultural engineer	3,000
2 mechanical engineers, at $3,240 [1]	6,480
1 mechanical engineer	3,000
1 mechanical and electrical engineer	2,500
1 agricultural engineer	2,500
1 hydraulic engineer	2,700
1 structural engineer [2]	2,500
1 junior engineer [2]	1,500
1 assistant in agricultural engineering	1,860
1 assistant in agricultural engineering	2,000
1 architectural draftsman	2,250
1 architectural draftsman	1,800
2 draftsmen (part time) [2]	1,000
1 mechanical draftsman [2]	1,800
Salaries	38,410
Travel	7,500
Equipment and supplies	2,090
Total	48,000

The total is $48,000. The $15,000 increase is requested for investigations and studies looking to the improvement or more efficient use of farm buildings and farm machinery.

As to farm and other rural buildings, in this time of high costs of material and labor, the farmer, who does 40 per cent of the building in the United States, is more than ever in need of expert advice, which is now lacking, since no thorough investigation of farm structures has ever been made.

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[1] Transferred from Bureau of Markets.
[2] New.

The requirements of farm buildings differ in many respects from those structures concerning which expert advice is plentiful. As a result of this lack of information the farmer often builds either wastefully or inadequately.

A great deal has been done toward the betterment of industrial housing, but practically nothing for the farmer, and his is a very special problem, for the requirements of the farm home differ materially from those of the urban home. Above all the farm home must be economical of space and material and must be arranged and equipped to meet the requirements of farm housekeeping. In addition to the utilitarian aspects, the outward appearance of the house must have consideration. It is a difficult matter to obtain pleasing architectural effect when utility and minimum cost are the prime consideration, yet the appearance of the farm home and its surroundings must be improved, for a goodly appearance of the farm buildings has a very decided effect on the morale of the farm organization. There is the sense of pride in the ownership of an attractive abode; the effect of pleasant surroundings, which, though intangible, is reflected in the contentment and loyalty of those concerned in the maintenance of the house, all of which affects the business of the farm in many ways.

Farm women are now greatly interested in modern water supply, sewage systems, heating plants, lighting systems, and labor-saving devices; all of which make for comfort and convenience in the farm home.

Only 10 per cent of the farm homes have water piped into the house, and 7 per cent are equipped with gas or electric lights. Data is not available in regard to other modern home equipment. These facilities are comparatively new developments and little is known relative to the efficiency of the various types. Such information as we have indicates the need for further investigations to determine how higher efficiency and better results can be obtained. Heating systems are being installed in many farm homes, but little investigation has been made to determine the efficiency of these systems.

Mr. ANDERSON. Let me ask you, there, is there any difference between the efficiency of the heating plant in the farm home and any other kind of a home?

Mr. McCRORY. There is a difference, to a certain extent, in the type. They probably use cheaper types more widely. There is no real difference.

Mr. ANDERSON. Is there available data as to the efficiency of heating plants, not with special reference to farm homes, but in general?

Mr. McCRORY. Not a great deal. The University of Illinois has been doing some work on heating plants in the past year or two. There has been a great deal written on heating plants, but there is a great need for investigation to determine how efficient they really are, and what can be done to improve their efficiency.

You take the ordinary stove, for instance; as far as I am aware, there has never been any systematic investigation to determine the efficiency, or how it can be increased, of a stove. Yet, if you will stop to examine the ordinary gas stove, for instance, which is used in most cities, the oven you will find is not insulated in any way, and it radiates heat in all directions, and it is not a very efficient implement.

There could be a good deal of work done, for instance, on stoves, which are probably used to heat more homes than any other apparatus that we yet have. And when you get into the field of the one-pipe furnace, there is a wide range in the claims of the different manufacturers as to the efficiency of those plants and the conditions under which they operate. The same is true of other types of heating plants. We get a number of inquiries in regard to why a furnace does not work well. We got out a little bulletin on "Operating a Home Heating Plant" last summer and we have had quite a large number of requests for that and some rather interesting responses to the information contained in it.

Mr. Wason. You do not expect that the average farmer uses a gas stove in his house, do you?

Mr. McCrory. No, indeed; but the gas stove occurred to me as a rather striking instance of poor design, possibly a more striking example of poor design in many ways than the other types of stove. If you will recall, there is just a thin sheet of metal that forms the oven.

Mr. Anderson. All of which indicates that the manufacturer is more interested in selling stoves than in making them.

Mr. Wason. But to come down to the farmer that you were speaking about. Let the fellow in the city use the gas stove—the general heating apparatus in the older parts of the United States is a cast-iron stove, is it not, with a wood fire?

Mr. McCrory. Yes; with wood or coal; or, in the Middle West, a cob fire is used very extensively during the summer. Then there are some of the simpler forms of oil heaters. Oil stoves are used extensively by the farm women. We get a good many requests for information about those.

Mr. Wason. As a matter of fact, your service would be practically confined to the stove burning either wood or coal, or an oil-burning stove in the country communities for cooking purposes and also for heating purposes?

Mr. McCrory. A good many requests are coming in now for information in regard to different types of better heating apparatus for homes than stoves. A good many farmers are replacing their stoves with one-pipe furnaces or hot-air furnaces. That was truer a year ago than it is now, but we still get letters making inquiries in regard to——

Mr. Wason (interposing). What part of the country do you get these inquiries from?

Mr. McCrory. They come from all over the United States.

Mr. Wason. On the farms?

Mr. McCrory. On the farms.

Mr. Anderson. Oh, yes; we have hot-water plants in the homes on the farms out in my country.

Mr. McCrory. Yes; many of the farm homes are equipped just as well as the average city home.

Mr. **Wason**. Well, they may be; but I would not expect that the real dirt farmers would have steam-heating plants in their houses for comfort or convenience.

Mr. **Anderson**. Oh, yes.

Mr. **McCrory**. Many of them have every equipment for comfort. I think there is a great demand for information in regard to that sort of thing, and I feel that we should be able to give them more information in regard to those things than we are able to give now. We have compiled information from the best available sources, but we should be able to put engineers into the field and give the subject intensive study.

Lighting systems, both gas and electric, are coming into use to some extent, but there is a great deal of difference of opinion as to the best types of plants for farm conditions.

Septic tanks are generally recommended for treating the sewage from farm homes, yet little is known relative to the results obtained in these tanks, which, on the whole, is the best device we now have for this purpose; but there undoubtedly is room for further improvement. A bulletin on "Sewers and Sewerage for Farm Homes" has been prepared and will be available for distribution in a few days.

A considerable saving in the cost of construction and increase in efficiency of farm operations may be made by careful planning of structures through the more economical use of materials, more efficient methods of construction, and better internal arrangement and equipment. We showed you yesterday a plan of a barn, which had been submitted to us by a farmer, which we redesigned, and were able to make a saving of about 10 per cent on it. There is much need for investigation with regard to the whole field of structures on farms. There has been almost no work done on this subject, and almost everything the farmers build probably could be more economically constructed.

Mr. **Wason**. What has become of the information that your department had at least a dozen years ago, when you prepared your model designs for farm buildings and barns, and sent them out?

Mr. **McCrory**. You probably refer to the dairy-barn plans, prepared by the Animal Industry Bureau. Those plans were taken over by this division. The obsolete plans were discarded, and other plans revised; but there has been a demand for more material. The type of materials that the farmer is using in his building is slowly changing. Lumber is getting more expensive, the quality is possibly not so good as he could buy a dozen years ago, and he is turning to poorer grades of lumber, and to concrete and clay products, and we get many requests for information along that line which we can not answer for want of reliable data.

Mr. **Wason**. What you say as to materials in the country is equally true of materials of the city house, is it not, to-day, in the commercial world?

Mr. **McCrory**. To a certain extent, yes; although in the city you have a somewhat different type of construction; and in the city you have inspection, and more rigid standards. The farmer has no restrictions of any kind placed on him. He is allowed to build almost any type of structure he desires. He has few plans available, and the problem of getting him to build a more economical type of construction is rather a difficult one. A good many of the colleges are working along the line of developing plans for improving the types of farm structures and building them more economically. One plan, that has been suggested, is to work not so much with the farmer as with the local country carpenter, and to teach him how to do his work more efficiently and in that way improve the standard of planning and construction.

Mr. WASON. Yes; but your answer a few moments ago related to the quality of the materials.

Mr. McCRORY. The carpenter has to work with those materials, and he is using in many cases the same methods with those materials that he used with the good lumber, etc., that he had 20 years ago, for instance.

Mr. WASON. Do you think you can use any other principles of construction or can you devise any others?

Mr. McCRORY. Take the barn roof, for instance. The old type of barn roof was a V-shaped roof with the rafters running up to a peak. One of the new developments in barn construction is the so-called Gothic type of roof, which is built up not from large timbers, but by using one by fours, and lapping them together and giving them a circular form. It is a more economical type of construction, and probably more efficient.

Mr. BUCHANAN. You do not contemplate conducting a school for carpenters, do you?

Mr. McCRORY. No, sir; one of the State colleges has been considering the advisability of doing that. My opinion in regard to its value was requested.

Mr. BUCHANAN. I do not see how the farmer has got along with his buildings, etc., heretofore. Do you not think these farmers keep pretty well up on the different plans and specifications of houses and barns, residences, and things like that, through the magazines and otherwise?

Mr. McCRORY. That is true; but a considerable part of the material that is being put out in the farm papers, in lumber papers, and that sort of publications, is coming from the work that we are doing. We are getting requests almost daily from farm papers asking for that sort of material; and a couple of years ago when the editors of the farm papers visited Washington, one of the criticisms that they made of our work was that we were not doing enough work along that line and not giving them enough new, up-to-date material.

Take a typical instance. Take the sweet-potato houses that have been used, that have been built throughout the South. With the old methods of storing sweet potatoes, the farmer was figuring on a loss of about 50 per cent.

Mr. BUCHANAN. The old type of sweet-potato house was corn stalks put up over the sack of potatoes, and leaving the corn stalks sticking out at the top, and I never saw potatoes keep better in my life.

Mr. McCRORY. Well, they were not all so fortunate. Some of the commercial houses have had losses as high as 100 per cent on potatoes stored, and the reports we get from the storage house we have planned is that it is being widely used throughout the country and that the losses run less than 10 per cent.

Mr. BUCHANAN. You have got on to another subject, now. You have got on to the keeping of potatoes. There might have been some sense in some investigation, economically or otherwise, or by observation or otherwise. But we were discussing the building of barns, and the making of plans and specifications for barns and houses. I believe that the farmers have got enough sense to build their own barns and houses.

Mr. McCrory. We get a great many requests from farmers who seem glad to follow our advice.

Mr. Buchanan. That may be.

Mr. McCrory. They often submit plans to us, and we frequently can make suggestions which make for efficiency and economy in construction.

Mr. Wason. Did you ever follow up one of those applications and find out that that was some fellow who was just beginning to take up farming and did not know just what to do?

Mr. McCrory. We get requests from all classes of people. We have been having some correspondence just recently, I recall, from one man in the western part of Maryland who had sold a farm somewhere else and who bought a farm for himself and his sons in western Maryland. He was desirous of getting plans that would be better for the structures he was going to build than those that he had had.

Mr. Anderson. Almost anybody, I take it, can design a barn and build it with a little help, but I doubt very much if anybody could build the best barn or the most economical barn that should be built. I built a house some time ago, and I thought that I knew something about it, and it was a pretty good house when we got through with it, but I think that I could build a whole lot better one now.

Mr. McCrory. I think that is true of most structures. They look comparatively simple, but by careful planning you can make economies that in the end aggregate a considerable amount.

Mr. Buchanan. That is true of your department, because you sent out plans and specifications of barns, according to my colaborer here, years and years ago, and you are improving on them now; so that experience seems to be a valuable feature all the way around.

Mr. Wason. Have you kept those plans that were being sent out on request 12 years ago up to date, with suitable modifications, as the years went by?

Mr. McCrory. We have tried to keep our plans up to date.

Mr. Wason. Twelve years have elapsed since that time, and I am wondering whether at this moment you have plans that a farmer could get any benefit from by looking over them. That is the point, boiled down into a nutshell. I am not talking about the theory of it, but practice.

Mr. McCrory. It is hard to give you a measure of the use that is made of plans. People write, and it is difficult to follow them up; but one way that we do get the indication of the value of the plans is when a county agent, for instance, will write in and ask for a barn plan of a certain serial number. Frequently, when we send one plan, we will get a request again for another plan, and possibly three or four plans for the same barn will go to one community, which apparently would indicate that they were making use of the plans.

In order to determine just how effective this work really is, we are just getting ready to circularize lists of men who have requested plans and find out how widely they are using them.

Mr. **Wason**. But the trouble about a plan is this: I can see the difficulty of it. Sometime, when I get a little time, I would like to look those plans over.

Mr. **McCrory**. We would be glad to have you look them over.

Mr. **MacDonald**. Mr. Chairman, I think perhaps we are rather overemphasizing some of these minor activities. The thing we want to bring out here, among other things at least, is that there are a great many people who are selling to the farmers all kinds of contraptions and utensils, and guaranteeing them to perform certain functions, and the farmer really has no one to ask whether these different methods and different implements and different machines will perform those functions or not except the department or his own agricultural State college, and our program here has been largely outlined after a calling into consultation the heads of divisions in agricultural engineering at a number of the different colleges and asking them what the department could do and what line of work it could carry on that would supplement and be of value to them. That is, we have no wish to duplicate an effort that is being made in the States. We would prefer not to do work that the States can do, but only to take up some of the major problems.

Mr. **Wason**. My point was not to criticise, but I was wondering how practical your work was.

Mr. **MacDonald**. I would like to have you see that diagram, in that connection, which was very illuminating to me. This upper study is one taken of a banked barn, a very good, well-constructed barn; but the ventilation was not as well controlled as in this type of barn [indicating]. Now, while that barn did not show a large variation—that is, it showed perhaps just about 15 degrees variation—in temperature, this one, where the ventilation was better planned and when there was a greater range of and much lower temperature outside, showed a difference inside the barn of not over 8 degrees in the temperature, which did not reach the freezing point; and particularly is the difference marked in the moisture. The air was changed more frequently and the moisture did not accumulate in the second barn.

Mr. **McCrory**. You get about two changes an hour in this barn.

Mr. **Wason**. That is of immense value to the dairyman.

Mr. **MacDonald**. Yes. I think we are bringing out some information, Mr. Chairman, that is not just what we want in the record. We wish to develop the basic facts of this character to be applied to these buildings that will be useful. This comes within the realm of science rather than of practical knowledge.

Mr. **Anderson**. Yes.

Mr. **Buchanan**. I want to make this statement. I do not want to be understood as criticizing, now, but during this period of depression, of high taxation, and hard times, I think the efforts of the Department of Agriculture should be developed along scientific lines where it takes a life study to work out these things; and these other questions, as to the form of barns and things like that, can wait awhile until this period of stringency is over with. That is only my own individual idea, and that is what prompted my question. I believe the farmers would appreciate a little relief from taxation more than they would a new model of a barn. Therefore, I do not think an increased appropriation for an improved model of barn would be justifiable at this period. An increased appropriation for the development of science for the discovery of some new principle that by ordinary observation or practical experience the farmer does not know, I am willing should be made. Otherwise, I am not.

Mr. McCrory. This study on the ventilation of barns we have been making during the past year was initiated at the request of the American Society of Agricultural Engineers, which had realized the importance of the whole subject. They took the matter up with the Secretary, and he instructed us to undertake it, and we had one man on that for about a year. We have begun rather a complete investigation, but we have had to stop that investigation this winter because we did not have the funds available to carry it on.

We carried it through last winter in cooperation with the South Dakota Agricultural College, the Michigan Agricultural College, and the Massachusetts Agricultural College, and we made tests on 19 barns. There is no question but what much more work is needed on the whole subject of ventilation. Many farmers are buying to-day ventilating systems that will cost from $600 to $2,000. Some of them are successful and others are not, and we do not know whether those systems are any better than some simple home-made systems that might be developed, but if that is to be worked out it requires a good deal of careful experimentation that costs considerable money and covers a considerable period of time.

The study in the ventilation of barns was one of two pieces of really outstanding research work that we were able to undertake with the appropriation of $25,000 last year.

In the field of farm machinery we made some investigation of the use of tractors and horses to furnish power, beginning the studies that were suggested at the Farm Power Conference in Chicago in 1919. The results of the first investigations in the corn-belt States in the use of horses and tractors, some of which we showed you yesterday in the form of charts, were secured by an investigation which was carried on cooperatively by the Office of Farm Management and Farm Economics, the Bureau of Animal Industry, and the Division of Agricultural Engineering, and it represented the viewpoints of the horse owner, the farm-management man, and the user of mechanical power. Some very interesting and rather significant things were brought out by that investigation.

During the past summer we continued the investigation in the winter-wheat section of the Middle West, and the results of that investigation are just being compiled. The general result of the investigation has been to show that the farm power on farms where tractors are used is divided approximately equally between the horse and the tractor, but that the cost of power developed by the use of tractors and the use of horses is a variable item, as might readily be expected. Under some conditions the tractor will produce power cheaper than the horse, and under other conditions the horse produces power and does the work more cheaply.

One of the principal advantages of the tractor over the horse, from the testimony of the farmers, is in the saving in time that it makes at critical seasons of the year, and the information we have secured from those studies is going to give the farmer a better basis than he has ever had before to decide what is the most economical source of power for him to use, and will give him some idea of how large his farm operations should be before he would be justified in considering the purchase of a tractor.

Mr. **Buchanan.** You have no doubt in your own mind but what in the process of years, horsepower, while not entirely eliminated, will be largely eliminated as a means of breaking land?

Mr. **McCrory.** The information that we have obtained indicates that in plowing and preparing the land for crops there seems at present to be the greatest field for the tractor.

Mr. **Buchanan.** And the investigations which you are now making, and the facts that you gather, develop and publish, in 10 or 12 years from now will be more useless than the barn my colleague was talking about, which you published 12 years ago. Progress is such that the results of this investigation will be of only temporary use to a few farmers who are experimenting.

In the investigation, did you not find farmers who had bought tractors who were keeping figures on them; farmers who were using horses and tractors, and who were making figures for themselves?

Mr. **McCrory.** Our information came entirely from the farmers. We got the best figures they had. or the best estimate they could give. But the information that they may have is of limited value unless they are able to compare it with the experience of other farmers, and is of little value to other farmers unless it is collected and made available to them.

Mr. **Buchanan.** The only answer to that is that in every agricultural section in the United States you will find some farmer that is experimenting, right now, with tractors, and in every community that experience will be talked about, and I expect it will get more advertisement from that than it will from your department; and in my opinion every county in the district has at least one tractor, and they are using it and they talk about it and tell their experience to other people; and naturally this information comes into use, and so it comes about as every evolution in human affairs comes about.

Mr. **McCrory.** Have you realized that more money was spent in 1920 on tractors than on any other type of farm machinery?

Mr. **Buchanan.** No; I did not know that. It would not be of much value to the farmers to know that.

Mr. **McCrory.** This shows in millions of dollars the amount of money spent for different items of farm machinery [indicating].

The amount spent on tractors was about $192,000.000. There was spent on other farm engines a relatively small amount. For tractor-drawn machines there was a smaller amount, about $40,000,000. On horse-drawn field machines there was spent $150,000,000, and on farm wagons about $35,000.000.

Mr. **Buchanan.** Under the heading of tractors, that includes for all purposes, I reckon.

Mr. **McCrory.** Yes; all tractors sold in the United States.

Mr. **Buchanan.** That is not exclusively farm tractors.

Mr. McCRORY. The bulk of those sold are used on the farm.

Mr. BUCHANAN. All sold in the United States?

Mr. McCRORY. This shows the number of tractors manufactured in the United States in the last five years [indicating], and will give you some indication of how rapidly the industry has grown.

Mr. BUCHANAN. Over 200,000?

Mr. McCRORY. Yes. About 30 per cent of the number shown in 1920 was manufactured last year.

Mr. ANDERSON. I would like to get through with Mr. MacDonald's department before we adjourn, if possible.

Mr. BUCHANAN. I am through.

Mr. MACDONALD. Mr. Chairman, we would like to leave the impression that what we want to work out is the scientific facts underlying these matters rather than any of the mechanical details about application. We are not anxious to get into that at all.

Mr. BUCHANAN. I think you are right.

Mr. McCRORY. I think that covers everything that I care to say on that item, Mr. Anderson.

FOR GENERAL ADMINISTRATIVE EXPENSES.

Mr. ANDERSON. Very well; take up the item on page 206, then, "For general administrative expenses." There are no changes in that item?

Mr. MACDONALD. There is no change there; no, sir.

SUPERVISING THE PREPARATION, DISTRIBUTION, AND USE OF EXPLOSIVES.

Mr. ANDERSON. The next is on page 207, "For supervising the preparation, distribution, and use of picric acid," and so forth.

Mr. MACDONALD. That item, Mr. Chairman, is requisite for the necessary expenses in distributing the surplus explosives, largely to the farmers, for use in clearing lands or in reclaiming lands wherever explosives are needed. I may say that we are arranging to charge the farmer a quarter of a cent a pound for this, which we anticipate will more than cover this appropriation. That money will be returned and covered into the Treasury as miscellaneous receipts.

Mr. WASON. So that it will cost us nothing?

Mr. MACDONALD. We estimate this item will not cost the Federal Government anything finally.

Mr. BUCHANAN. This is material that has been turned over to you?

Mr. MACDONALD. It is surplus war explosives turned over to us by the War Department, which we are cartridging and shipping to the farmers and the road-building agencies, they paying the entire expense of cartridging, shipment, and handling.

Mr. BUCHANAN. This is on the line of that road machinery?

Mr. MACDONALD. Yes, sir; exactly.

Mr. BUCHANAN. Very well.

Mr. MACDONALD. We had thought if we could make a small charge we could eliminate this item; but we find we can not use that money to pay the expense, that we have to turn it into the Treasury; so that we have to retain this item.

Mr. BUCHANAN. I think this method is correct; turn the money into the Treasury and get an appropriation.

Mr. MacDonald. We expect to turn back, as the result, as much as this item has cost us or more.

Mr. Anderson. How much of this stuff was turned over to you?

Mr. MacDonald. Twelve million four hundred thousand pounds altogether, of which something over 3,000,000 pounds was at Sparta, Wis. We have shipped from Sparta 2,800,000 pounds of picric acid, and we have the remainder at Fort Wingate, N. Mex.

Mr. Anderson. That will be a litte more difficult to get rid of; the freight charges will be considerable.

Mr. MacDonald. We are trying to work out a plan there with the Federal Traffic Board by which we will deliver the explosive to the farmer. If we can do that we will get the advantage of the land-grant railroad rate, and will be able to lay down the explosive to the farmer at some considerable distance at a rather low rate.

Mr. Anderson. Have you any average figure in your mind as to what this stuff will cost the farmer delivered?

Mr. MacDonald. It has cost him, in Wisconsin, when shipped from Sparta, Wis., about 9 cents.

Mr. Anderson. These other explosives cost 16 or 18 cents?

Mr. MacDonald. More than that. We figure that the picric acid is equivalent to 40 per cent dynamite, or perhaps a little better, and that, as Mr. McCrory states, is at 17½ cents now. It was a higher figure before.

Mr. Anderson. I notice in your detailed estimates for this year you have, "Reserve to cover bond, $5,000." What do you mean by that?

Mr. MacDonald. We started to handle the distribution of 12,000,000 pounds of picric acid on $15,000. We made a contract for cartridging the explosive. It is loose, in bulk form, now, and it has to be dried and cartridged, and the cartridges paraffined, before it can be shipped. We do not ship any of it in bulk form, because it is presumed to be a very sensitive explosive if it comes in contact with iron or lead. We had to put up a bond to this contractor amounting to $5,000, guaranteeing him payment for the shipments which he made to the States. We do not expect to draw against that, because we collect the money before we make the shipments of the material; so that is more a formality than anything else, but it was demanded by the contractor.

Mr. Anderson. Is that situation so that it will not go back into the Treasury?

Mr. MacDonald. It will go back this year.

Mr. Anderson. It will go back?

Mr. MacDonald. Yes.

Mr. Anderson. Do you require more money this year than you required last year—I mean for the coming year?

Mr. MacDonald. Yes; we expect to distribute more than 2,800,000 pounds next year. We expect also that we may be asked to do some demonstration work in the localities where the States are not doing so much.

Mr. Anderson. What is this stuff used for mostly in the States, blasting stumps?

Mr. MacDonald. Blasting stumps, ordinarily, although we think it might be used for drainage operations, and we are using it for road building.

Mr. **Anderson.** I recall last year Mr. Hawley made some inquiry, I think, in regard to the possible use of this material for breaking hardpan, out in Oregon somewhere. Has any of it been used for that purpose?

Mr. **MacDonald.** None that I know of.

Mr. **McCrory.** Kansas is planning to use some for that purpose.

Mr. **MacDonald.** There is no reason why it should not be.

Mr. **Anderson.** Are there any questions? Is there anything further in the bill, Mr. MacDonald, that you want to speak of?

Mr. **MacDonald.** No; there is nothing more, Mr. Chairman.

Mr. **Anderson.** There is nothing in these Federal aid items which has any relation to expenditures of funds.

Mr. **MacDonald.** No, sir.

Mr. **Anderson.** So that I take it there is no need for us to go into that item at all.

Mr. **MacDonald.** No. They are not involved, except that one point that we were going to take up with the solicitor to see if it was necessary to carry that item further.

Mr. **Anderson.** That is entirely for experimental and research work?

Mr. **MacDonald.** Entirely; yes, sir.

Mr. **Anderson.** Very well; we are very much obliged to you, Mr. MacDonald.

Wednesday, February 15, 1922.

Insecticide and Fungicide Board.

STATEMENT OF DR. J. K. HAYWOOD, CHAIRMAN INSECTICIDE AND FUNGICIDE BOARD.

Mr. **Anderson.** We will take up the item on page 240; enforcement of the insecticide act; statutory roll.

ORGANIZATION, DUTIES, AND ACTIVITIES.

Dr. **Haywood.** I will explain to you first, Mr. Chairman, just to bring it to your mind again, that the board is composed of four members, representing four bureaus of the department; that these men are all heads of lines of work in their respective bureaus; entomology, plant industry, chemistry, animal industry. None of their salaries are paid from the board funds except the salary of the chairman of the board, who also represents the Bureau of Chemistry. His salary is paid from the board funds.

Working under the Bureau of Chemistry representative of the board is a corps of chemists, bacteriologists, and microscopists, who are engaged in the examination of samples. They are paid by the board. Under the Bureau of Entomology representative is a corps of entomologists; under the Bureau of Plant Industry representative is a corps of plant pathologists; and under the Bureau of Animal Industry is a corps of scientists. All of the employees are paid from the board funds.

The board is engaged in regulatory work only—i. e., the enforcement of the insecticide act—but we have to carry on some investigations in order to enforce the act. Before we make any investigations, however, we get the board members in the respective bureaus to find out if any similar investigations have been made in their four bureaus, which will serve to answer our question, thus saving duplication of work. In that way we save the duplication of a great deal of work, and it makes an organization which uses all the work of the four bureaus that is of service to us.

When we first commenced enforcing the insecticide act a large percentage of the samples that were collected, were adulterated or misbranded or both. At any rate, we had to collect samples of all preparations coming under the act to find out whether any of them were adulterated or misbranded. At first the inspectors could collect nearly any sample that came along, but as the enforcement of the law has progressed, a great improvement has naturally come about in the labeling, preparation, and composition of insecticides and fungicides, so that now, while our inspectors inspect and collect new products that they find on the market, they do not collect all the miscellaneous samples they encounter, but their work is more directed along the line of campaigns against specific illegal practices that we have found existing in the insecticide and fungicide trade.

For example, during the past fiscal year we found that a very chaotic and unfair condition existed in the disinfectant market, due to the fact that certain manufacturers of disinfectants and dips from coal tar and certain manufacturers of disinfectants from pine oil were adulterating their products with mineral oil. This resulted in those certain manufacturers who were engaged in this illegal practice being able to undersell all their competitors; because they were selling their products under the name of pine oil disinfectants and coal tar disinfectants, but were cheapening and debasing said products with mineral oil, which is worthless as a disinfectant. We made a very careful investigation of this condition and found out the sources from which these products seemed to be coming, and made a thorough campaign against the products coming from said sources; seizing them under the seizure section of the act, and prosecuting the manufacturers under the criminal section of the act. As a result, we have largely cleaned up that condition, and the legitimate disinfectant trade feels very kindly toward the board for the remedial measures taken in the matter.

There still remains considerable work to be done along the same line, either during this or the coming year, because the campaign already made was made primarily against goods shipped by several large manufacturers to repackers. These repackers repack the materials in smaller containers and market them under their own labels. Many of these repackers have gotten into the habit of selling the adulterated articles, and it will be some time before their products can be cleared from the market.

During the last fiscal year and continuing into this year we made a regular campaign against insect powder—ground pyrethrum flowers—adulterated with daisies. You would be surprised to know how much insect powder is sold in the United States. A large amount is manufactured in California, and sold under the name of Buhac.

There are large importations of the pyrethrum flowers used in manufacturing insect powder from Japan, from Dalmatia, and from countries adjacent to Dalmatia. The pyrethrum flowers do not usually come into this country adulterated, but they are imported into this country and are often adulterated during grinding with powdered daisy flowers; just the common field daisy. When the two flowers are ground up together it is impossible to detect this form of adulteration with the naked eye. It can only be detected by the microscopist and a method for such detection had to be worked out by our microscopist. We found this practice existed and started a campaign against it. The daisy is worth a few cents a pound, and the pyrethrum flower 40 or 50 cents a pound, so that you can see the reason why this form of adulteration was and is practiced. The daisy is absolutely inert as an insecticide. To a large extent we have broken up that practice, but we will have to continue our campaign during this and perhaps the coming year.

During the past year and continuing during this year, we have also made a campaign against nest eggs sold as insecticides. Manufacturers are making large quantities of nest eggs which are composed of napthaline, and claiming that these will kill the lice and mites on the chicken. As a matter of fact, they do not kill either. They also claim that they disinfect the nest. They do not do it. We have had to make a regular campaign against nest eggs of this character, and it has been a hard campaign, because the manufacturers who have established a trade are reluctant to discontinue the manufacture and sale of the egg.

We have also during the past year given special attention to disinfectants. There are probably about $10,000,000 worth of disinfectants sold in this country every year. I can not think of any class of products on the market, unless they are patent medicines, that are adulterated and misbranded as much as many of these different disinfectants are.

It appears that some of them are easy to manufacture, and therefore anybody that has a little back shed tries to manufacture disinfectants. Their business grows, and they are soon doing an interstate business. They have no knowledge of how to disinfect at all. I have examined products sold as disinfectants that could not disinfect under any conditions, many products that, at the dilutions recommended, could not possibly disinfect, and many that could not possibly disinfect under the conditions of their use. For example, a label will state, "Put a saucer of the disinfectant in the middle of the room to disinfect the room," for disinfectants that are only slightly volatile. That is an absurd way to attempt to disinfect, and you can not disinfect that way. Therefore we have had a great deal of trouble with disinfectants; the flagrant misbranding of disinfectants has improved, but will continue, because new ones are constantly being placed on the market. I do not wish you gentlemen to think all disinfectants are misbranded and adulterated. Many of them are manufactured by high-grade firms and are most excellent products.

During the past year we have also continued our campaign to see that in the South and in other parts of the country, but especially in the South, the calcium arsenate that is used against the cotton-boll weevil particularly, and also used in other parts of the country for the control of certain leaf-eating insects, reaches the consumer in a condition that it will be strong enough to control the insect, and at the same time will not burn the foliage. This has been a rather extensive campaign and has taken a good deal of our energy and time. During the fiscal year ending July 1, 1921, we inspected 130 shipments of this product, representing about 4,000,000 pounds of the product. To do that we had to examine some 3,000 samples. Nine shipments were seized, 11 cases prosecuted, 23 cases that were not so serious were taken up by correspondence. So that you can see there was a good deal of adulteration and misbranding of this product. I believe, however, that a good deal of that was not due to the fact that the manufacturers were trying to adulterate their product or misbrand it, but it was due to the fact that calcium arsenate is rather a new insecticide and the manufacturers had not gotten down the fine points of making it like they had the lead arsenate, paris green, and insecticides of a like character. This situation has improved a good deal at the present time, and is continuing to improve.

I will tell you about just one more campaign, viz, our campaign against the hypochlorite disinfectants used in dairies and places of that kind. These hypochlorite disinfectants, if used correctly in the practical absence of organic matter, are very strong disinfectants, but if used in the presence of any organic matter, are very weak disinfectants. This fact has not been recognized by the trade, and on most of these labels one is told to use certain dilutions for cleaning out milk bottles, milk pails, milk machinery, and everything like that around a dairy. If one followed the directions on the label he would not kill the bacteria present, because all of the hypochlorites would be used up by the organic matter present in the milk; but if one simply washed the dairy utensils before applying the hypochlorite solution and then applied it at the dilutions that are recommended the bacteria would be killed. We have had to straighten out a great many labels of this kind. Used as directed on the labels in use before our campaign started these hypochlorite solutions were of little value, but used as directed on the corrected labels, the products are efficient.

GROWTH OF WORK.

I will not go into any further campaigns, but will tell you of the growth of the insecticide and fungicide business. When this law was passed in 1910 the total sale of proprietary insecticides and fungicides by the manufacturers of this country, probably, as well as we can estimate it, amounted to about five or six million dollars a year. Now it is about $40,000,000 a year. That has taken place in 11 years, so you can see the growth of the business. During that time, with the growth of business, there has been, of course, more and more for the insecticide and fungicide board to do each year, and our appropriation has not kept pace with the growth of the business. We are not asking for any more appropriation this year, but we are asking that our appropriation be not reduced for the following reasons:

The business has grown so fast that we are hardly able to control it efficiently with our present appropriation. We have made all the economies that we feel we possibly could make during the past year without actually curtailing the work and cutting it down seriously. We carefully scrutinize—I personally carefully scrutinize every voucher and every purchase, and I have turned down many requests for purchase during the past year. We have arranged our inspection help on such basis that they cost us less than they did before per man and are producing more work, and have arranged our clerical and scientific help so as to obtain the greatest degree of efficiency.

Mr. **Anderson**. It is of some advantage, evidently, to have these appropriations kept down a little.

Dr. **Haywood**. We have done the best we could, because we recognized the state of the Treasury and that there must be economy. We have done the best we could along that line, but there is an "irreducible minimum," and we have about reached that. Therefore we simply place this matter before you as it exists and ask you to carefully consider this appropriation in the light of what I have just said. We are not asking for any increase this year, but I do not doubt that whoever is chairman of the insecticide board next year will ask you for an increase in the appropriation, because it is needed.

I might add that as time goes by it becomes more expensive to enforce the law, because the adulteration and misbranding assumes a less gross character and becomes more subtle, so that it is often necessary to carry on long investigations before we are in a position to handle our cases in the courts.

Are there any questions that you would like to ask me?

Mr. **Anderson**. I think there is a good deal of advantage sometimes in a situation that compels people to look themselves over and see whether they can effect economies or not, but at the same time I recognize, not only in this department but in some of the others, we have about reached the point where we have got to expect some degree of expansion. I notice a statement by the chairman of the Appropriations Committee the other day substantially to the effect that eliminating the public-debt expenditures—eliminating the expenditures for debts growing out of the war, like the Forestry Service—that the appropriations this next year would be approximately 10 per cent above 1916. Now, that is less than the normal rate of expansion. Obviously we can not continue indefinitely, and finally you are bound to reach the point where there has to be some expansion. Personally, I would have been very glad if it could have been reached before this.

Are there any questions on this item? Your general statement covers both your statutory roll and the general items?

Dr. **Haywood**. Yes, sir. There is no change in the statutory roll at all.

Mr. **Anderson**. Well, we are very much obliged to you, Mr. Haywood.

TUESDAY, FEBRUARY 14, 1922.

FEDERAL HORTICULTURAL BOARD.

STATEMENT OF MR. C. L. MARLATT, CHAIRMAN FEDERAL HORTICULTURAL BOARD.

SALARIES.

Mr. ANDERSON. We will take up the items beginning on page 242, for the Federal Horticultural Board. The first of those items is the statutory salary list, in which you have some changes.

Mr. MARLATT. I think, Mr. Chairman, they are all explained in the note at the bottom of the first statement, an apparent increase of $8,040, and an actual decrease of $720. The statement is, I think, fully informing as to the changes made.

Mr. ANDERSON. Is the object of these changes to increase the salaries of your employees?

Mr. MARLATT. I think that is the object, as near as I have it here. Some lower grades have been dropped and three clerks of class 3 have been added—four clerks of class 1 and two messenger boys have been dropped.

Mr. ANDERSON. You have dropped some of the employees in the lower grades in order to make some room at the top?

Mr. MARLATT. In addition to that, in connection with these lower grades, it was not possible for a considerable period to fill them. Several of those grades remain vacant because the salary was too low to fill them.

Mr. ANDERSON. Will you say how many vacancies you have now?

Mr. MARLATT. I can not answer that. I do not think there are many, if any. The work of the board is growing rapidly, and the employees are increased in proportion to the growth of the work, so if there are any vacancies, they must be in the lowest grades of messengers, where we have not been able to fill the places.

NOTE.—There are two such vacancies.

Mr. ANDERSON. Do you require any special ability or experience on the part of the clerks in this service? Do they have to be trained?

Mr. MARLATT. Yes. The higher grade clerks—we need men of as high ability as we can obtain. The work involves technical information both as to the plant diseases and insects as to the legal construction of quarantines and regulations, and further, as to the technical features of the commerce that is controlled. They should have some familiarity with the scientific and varietal names of the plants brought under quarantine.

For example, the quarantine that controls the entry of nursery stock and other plants and seeds involves the whole gamut of plant varieties. For example, there are several thousand varieties of a single class of bulbs, as the gladiolus.

Mr. ANDERSON. I wonder if you could furnish us with a statement showing the places that are transferred from the lump-sum roll on the next page to the statutory roll. It does not indicate what the places that are transferred are.

Mr. MARLATT. I will be very glad to insert such statement.

Statement showing changes and transfer, Federal Horticultural Board.

Title.	1922		Increase.		Drop.		Transfer from lump fund.		1923	
	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.
Secretary of board	1	$2,280							1	$2,280
Executive clerks	2	2,000							2	2,000
Clerk	1	1,980					1	$1,980	2	1,980
Clerk, class 4	4	1,800							4	1,800
Clerk, class 3	2	1,600	3	$1,600					5	1,600
Clerk	1	1,560							1	1,560
Do	1	1,500					1	1,500	2	1,500
Do	3	1,440							3	1,440
Clerk, class 2	2	1,400							2	1,400
Clerk	2	1,260							2	1,260
Clerk, class 1	11	1,200			4	$1,200	2	1,200	9	1,200
Messenger or laborer							2	720	2	720
Messenger boy	1	600							1	600
Do	1	480					3	480	4	480
Do	2	360			2	360				
Charwoman	1	240							1	240

TO REGULATE THE IMPORTATION OF NURSERY STOCK, ETC.—TO ESTABLISH AND MAINTAIN QUARANTINE DISTRICTS.

Mr. Anderson. We will take up your item on page 243, "An act to regulate the importation of nursery stock and other plants and plant products; to enable the Secretary of Agriculture to establish and maintain quarantine districts for plant diseases and insect pests, etc."

You are not asking for an increase?

Mr. Marlatt. No increase is requested. This is our general administrative fund. The act quoted has for its purpose the prevention of the entry of foreign pests by means of imported nursery stock and other plants and plant products, and the control within the United States of any newly established plant enemies, insect, or disease. This item covers the administrative expenditures for the enforcement under this act of some 24 foreign quarantines—24 different subjects, plants, and plant products—and the control within this country as to interstate movement of 14 different quarantines. This fund covers the administrative expense in connection with that work. It involves not only the administration here in Washington but also the port of entry inspection and control at the border ports of the United States as a part of the administration of the quarantines.

This port-of-entry service is a very important feature of the work of the board and was strengthened by an increase to our appropriation two or three years ago, but I am frank to say that the present needs have much exceeded that increase, and this work is now undersupported. We have been forced to carry it to a certain extent from other appropriations assigned to the board.

Such support is legitimate, for the reason that these other special appropriations—the pink-bollworm appropriation, for example—involve a great deal of the port-of-entry work. The pink-bollworm quarantine involves control of the importation of foreign cottons, an enormous volume of import business, which I think I have described to this committee heretofore.

Mr. ANDERSON. My recollection is that we never transferred to the statutory roll, or the general administrative item, any part of the pink-bollworm work, as we should have done otherwise, because of the fact that at the time those appropriations were made we hoped this would be a one, two, or three year job, and when it was through it would have been done, and we did not want to make a permanent increase in the general administrative funds so long as it was on a temporary basis.

Mr. MARLATT. You are absolutely right in that belief, and no transfers have been made from such funds to the statutory roll.

In this port work certain inspectors, engaged in work which has direct relation to the pink bollworm—the inspection and entry of foreign cottons—are paid out of that fund, where if our funds were adequate they could be paid out of the general administrative fund.

Mr. ANDERSON. What is the relation between this item, for instance, and the quarantine work that is done under the appropriations for the blister rust, or Gypsy moth, which involve quarantine work? Do you have general supervision of that quarantine, or is it conducted under the separate item?

Mr. MARLATT. I will be very glad to explain that matter. The plant quarantine service—foreign and domestic—is all under the authority of the plant quarantine act of 1912, and is administered in accordance with the terms provided for in the act itself, by a Federal horticultural board.

In addition to the administration of foreign and domestic quarantines, Congress has appropriated special funds for the control or eradication of important newly established pests, and of these the funds relating to pink bollworm, potato wart, and date scales, have been assigned to the board. We administer those fully, but cooperate as to all technical matters with the bureaus concerned. Other similar appropriations have been made and referred to bureaus of the department. For example, to the Bureau of Entomology have been referred the appropriations for moths, corn borer, and Japanese beetle; to the Bureau of Plant Industry, appropriations for grain diseases, citrus canker, and white-pine blister rust. As already indicated, all of the quarantine work under these appropriations, whether made directly to the board or bureaus, is under the Federal quarantine act, and so far as the quarantines and regulations are concerned, they are prepaid by the board, with the advice of the bureaus concerned. In the case of appropriations made to bureaus, the fiscal details, the employing of experts and inspectors, and the general administration of the quarantines are the work of the bureau; in other words, the bureau becomes, in a sense, the agent of the board, both fiscal and administrative.

It is a question to be considered whether such appropriations should not all be referred directly to the board, or, perhaps, should be kept as a separate appropriation apart from the bureaus. The bureaus are essentially research bodies, and the possibility has been repeatedly discussed of placing all plant quarantine appropriations under the board. The board is not urging such change.

Mr. ANDERSON. Some of the appropriations involve both items, the eradication and quarantine. It would be rather difficult to separate the work of quarantine from the work of eradication.

Mr. **Marlatt.** That has been the reason, I fancy, for the reference. The corn borer, for example, was originally an independent appropriation for the administration of the Secretary of Agriculture, but is now assigned to the Bureau of Entomology. The cooperation, however, remains the same. It is a matter of bookkeeping.

Mr. **Anderson.** Is there anything further on this item?

Mr. **Marlatt.** I would like to indicate a little more fully the importance of this port-inspection work. I have some statistics here, showing its growth, its tremendous service to the country in intercepting diseases and pests. It has now been extended to the principal southern and eastern ports of entry—New Orleans, New York, Boston, Baltimore, and Philadelphia, and in the West to Portland and Seattle.

The Pacific coast south of Portland is taken care of by the State of California in cooperation with the Federal Horticultural Board. That State is spending annually from $50,000 to $75,000 in port and other inspection work, a good deal of which is work which otherwise would have to be assumed by the board. Florida is spending nearly as much, and the ports of those States are minutely and carefully safeguarded at very little cost to the department.

If I had time and you had time, I could list some of the important interceptions showing the tremendous importance of the work. I will give one illustration of an interception made the other day.

This innocent looking grub [a vial filled with whitish grubs] is a portion of the number taken from some potatoes that recently came to New Orleans from Mexico. The potato is of South American origin. Fortunately it got away from South America practically without pests, but in the Andes of South America the potatoes are eaten up by the grubs of various beetles which work in this manner [exhibiting a photograph of an infested potato]. The potato the world over is absolutely free from such attack, except in South America and apparently Mexico. We have for some time prevented by quarantine the entry of the potato from these countries. There are some three or four beetles of this kind [indicating] in the Andes region, attacking potatoes in that manner [indicating]. You can see the probable outcome if they got into this country. The other day at New Orleans 1,000 pounds of potatoes were found as a part of the ship's stores on a steamer arriving from Mexico. All arriving vessels are boarded by our men, and ship stores and the effects of the crew, and the goods of the passengers, if any, are examined to see if they contain any contraband plants, etc. In this instance these 1,000 pounds of potatoes were found eaten in that manner [indicating]. The landing of any of these potatoes might easily have carried a potato pest into the country, possibly worse than any we now have of all the insect tribe. It attacks the part of the potato which we eat, rather than the leaves and stems.

These [indicating other photographs] illustrate other things; for instance, pests coming in with plants with earth on their roots. That is the way the Japanese beetle came in. The grubs are not those of the Japanese beetle [indicating], but are from Japan and of much the same order. These plants [indicating] have dense roots, and were found on inspection to harbor these grubs [indicating].

These [exhibting photograph] are some of the same larvæ, enlarged.

This [indicating] is an interception of yams from the Philippines. They look scaly, and, in fact, they are. Those specks [indicating] are the scales of an insect which might attack our yams and sweet potatoes.

Here [exhibiting photograph] is an alligator pear, brought from Mexico, which was intercepted at the port of entry, full of worms, and these are other things [indicating] of the same kind.

Here is an illustration [exhibiting photograph] of the difficulty of finding these pests when hidden under bark. That twig [indicating] looks healthy, but the inspector discovered some slight enlargement of the bark, and, cutting it open, found these eggs underneath.

Here is an interesting interception of an unusual kind. It is a package of twigs sent to a Chinese drug store. Caterpillars seem to be one of the favorite staple medicines of the Chinese. These were living worms sent to this country in a bundle of twigs for medical use! These are merely illustrations. That [indicating] is another one. It is a brown-tail moth nest, and had about 40 larvæ in it, and we are collecting hundreds of these.

Here is another insect, many times intercepted, that we do not have in this country at all. Each one of these tiny nests has four to six larvæ of an insect in it, which is troublesome in orchards and gardens in Europe. There are thousands of such interceptions every year, and the port and other inspection work of the board is a work of great value to the country. For needed extension of this we should now have about $50,000 more, and when the country gets richer we will ask you for it.

FOR EXTERMINATION OF THE POTATO WART.

Mr. ANDERSON. If there is nothing further on this item we will take up the item on page 244, the potato wart; $24,100.

Mr. MARLATT. The potato wart is one of the diseases which was considered when the quarantine act was before Congress from 1908 to 1912. Unfortunately, there was some delay in getting the act, and, as we now know, the year before the act was passed the potato wart got into mining sections in Pennsylvania, West Virginia, and Maryland with one of the last importations of potatoes from Germany. The occurrence of this disease in eastern Pennsylvania was discovered in September, 1918, and the year following Congress made an appropriation of $50,000, to be expended in determining whether the pest could be eradicated, how widespread it was, and what control could be effected if eradication should prove impossible. This work has been going on now for three years. The inspection to determine possible spread has been country wide, in cooperation with State men. There is a very fine body of plant pathologists, State and Federal, and by using the State's men, we have been able to make a survey, country wide, from Maine to California and from Michigan to Florida. This survey has been so thoroughgoing that the experts believe that the potato-wart disease is not in this country, except in these limited mining districts in the three States I have mentioned, and apparently it has not spread from these districts so far.

It would be a mighty good thing if we could eradicate it, but that has been given up. The disease is in the soil. It remains in the soil for six or eight years and, perhaps, longer. We have investigated the means of sterilizing the soil, but the cost would be prohibitive. It is conveyed in various ways, on the feet of animals, and the winds blow it, and to eradicate it is believed to be impossible.

A great deal, however, has been done of great value; not only has the biology of the disease been worked out, but it has been determined that a great many potatoes are immune to it.

The testing of potatoes for immunity, which has been going on for two or three years, now indicates 143 varieties as immune to the disease, as against 182 susceptible varieties. Unfortunately, there is one group of potatoes, the Rural group, which is a specially important group for the middle section—Pennsylvania and the southern New York region—which seems to be generally susceptible.

The studies to determine the possible spread of the disease; that is, in relation to climate and soil conditions, confirms the belief that it can thrive anywhere in the United States; but, if we have 143 immune potatoes and more to come, it ceases to be the dreaded pest that it was at the outset. We can stop growing the susceptible varieties and control it in that way, and in the areas infected that control is being exercised. In these areas no potatoes except the immune sorts are allowed to be grown, as a check to the spread of the disease. The disease has to be there to be spread, and if the potatoes are immune they make no addition to the local infestation.

Mr. **Anderson**. Will the potato which is immune carry the disease and affect potatoes elsewhere?

Mr. **Marlatt**. No; the disease is a definite organism. It is a wart-like growth which ultimately develops spores, and without the disease and spores there is no spread. It is desirable to continue this work along the present lines for at least another year. I should say this need not be a continuing appropriation but we are in the midst of the work of determining immunity, and it is necessary also to continue a certain amount of quarantine control and survey, and to see that these regions are safeguarded by the growth of immune potatoes. This work, together with the scientific studies of the disease, which is also made under this appropriation, is in cooperation with the Bureau of Plant Industry.

As to the inspection work, during the last year, a total of 10,000 gardens in these districts, and in the surrounding country, were inspected to determine spread. The total number of gardens infested in the districts involved—eastern Pennsylvania, and the western district, which passes from Pennsylvania across Maryland into West Virginia is 1,000, but they represent only 100 acres. Most of the infested points are small potato patches, some of them being only half the size of this room, but they are scattered over the three States.

Mr. **Anderson**. What States did you say?

Mr. **Marlatt**. Pennsylvania, Maryland, and West Virginia.

FOR ERADICATION OF PINK BOLLWORM OF COTTON IN MEXICO.

Mr. **Anderson**. We will take up the next item, page 261, relative to the eradication of the pink bollworm.

Mr. **Marlatt**. That is the large appropriation that has been assigned, for a half dozen years, to the Federal Horticultural Board for administration. It covers quarantine work and also the actual control work and efforts to eradicate.

I think the committee members know a good deal about this worm by this time. Its importance has not diminished in any way, as time goes on.

I have on my desk an extended report which I just received to-day, and was in the midst of reading when I was called over here. It is the result of an independent investigation undertaken for the Secretary by the Bureau of Markets and Crop Estimates, to see what the pink bollworm meant when looked at it from that standpoint, and this report seems to fully confirm the importance of the pest in Mexico. It is based on an investigation made in the Laguna district in Mexico.

Just a little item to show the numbers of this pest in the Laguna: There were collected from the seeds discharged from baling of one bale of cotton, 27,000 pink bollworms. The loss this year is less from the pest than last year. Last year it approximated 50 per cent of the crop. Our estimates were upward of 45 per cent. The estimates made by a special commission sent to the Laguna by the Governor of Texas in the fall of 1920 reported a loss of 50 per cent—a commission in part of doubting Thomases, who did not believe there was such a thing as a pink bollworm. When this commission returned there were no doubting Thomases.

With respect to the pink bollworm-eradication work I should like to submit some maps, which show the present status of the pink bollworm in the United States. This map shows it.

INFESTATIONS OF PINK BOLLWORM IN UNITED STATES.

Mr. **Anderson.** There has been some increase in the number of infestations?

Mr. **Marlatt.** Yes. The original infestations were in that area in southeastern Texas, painted red [indicating], and the little point above it [indicating] which represents Hearne, Tex. Since that time infestations have been determined on the Pecos River in Texas and in New Mexico; and last year it was found in the upper Rio Grande, near El Paso. The infestation in the great bend of the Rio Grande was found the year before. Such infestations along the Rio Grande can not be prevented as long as the pest occurs in Mexico, and as long as the present freedom of movement across the Rio Grande exists, in spite of the efforts to control it of the military forces, and the immigration and customs services.

From the viewpoint of possible extermination, the present status of the insect is very encouraging. I could not have said that last spring, when on account of very inadequate State legislation we could not do in Texas what we thought should be done. Louisiana, on the other hand, had given every support, and had made large appropriations. The failure of Texas meant the apparent failure of the whole effort. This led to the calling of a pink bollworm conference by the Secretary of Agriculture last May. That was an important conference, with delegates from all of the cotton States, including a large delegation from Texas. An important result of the conference was a promise from the Texas delegates that Texas would give the needed legislation. In point of fact, Texas did, at a special session of the legislature, convened in July, enact a very good pink bollworm law, giving fairly adequate authority for eradication work. That law provided also for compensation to farmers in zones where the growth of cotton is prohibited. The only method of eradicating this pest is to stop the growth of cotton in the invaded areas.

The Secretary promised this conference of May 16 that he would ask Congress to join with the States concerned in such compensation; and authority for such action was given by Congress, by the joint-resolution of August 9, authorizing the use of $200,000, or so much thereof as might be necessary, out of the existing pink bollworm appropriation, for such compensation. So far no money has been spent for the purpose from the Federal appropriation, but certain liabilities have been incurred. The States are to be reimbursed in proportion to the amount they spend, not to exceed one-third of the amount paid by the State, and not to exceed a certain amount per acre, $5. Just what the liability of our fund under that will be we do not now know.

We have a report from Louisiana indicating a possible liability to that State of $42,000. Such reimbursement is under the control of the Secretary of Agriculture, and I do not know how far back he will be willing to go.

Mr. ANDERSON. Where cotton growing is prohibited they are permitted to plant other things if they can grow them?

Mr. MARLATT. Oh, yes; and the compensation is supposed to take that into account.

That was the situation up to this fall. In the latter part of October and in November two new and disquieting infestations were determined in the most important cotton section of Texas. These had evidently resulted from a movement of seed from Carlsbad, N. Mex,. prior to discovery of the infestation at that point January 6, 1921, and opened the possibility of infestations at other points in Texas where such seed had gone.

Mr. LEE. When was your discovery made, last year?

Mr. MARLATT. Yes, sir; last year, in the fall of 1921.

Mr. LEE. You do not know whether it has spread?

Mr. MARLATT. Is seems to be limited to two points, one in Ellis County of five fields and one in Grayson County involving one field. All the movement of seed from Carlsbad, N. Mex., was traced, and every point where it was taken into Texas and other States was found. A thoroughgoing investigation of now several months indicates no other points. In fact, the likelihood of infestation from the Carlsbad seed was small, because most of the movement of seed that we have a record of was one and two years before the actual discovery of the infestation at Carlsbad, and probably before there was any infestation there. The movement that is most dangerous is the movement of the fall of 1921, and this involves only a few points. With a great deal of that movement the seed was crushed. Most of it was in small lots. The infestation in New Mexico was then just beginning and investigation indicated that it was very slight. There were only 16 worms found all together at Carlsbad, and these were in two fields only, after a search of several hundred man-days, involving each field in the district.

For these reasons and supported by the intensive inspections of all points under any suspicion, it now seems that we have probably determined the only two new points of infestation. These points of infestation are practically on the same basis as Hearne, Tex., in 1917, which was cleaned up, and no reoccurrence has been found in the five-year period since. There is no reason therefore to believe that these points may not be similarly thoroughly cleaned up. All cotton has been destroyed, and all other measures have been put into operation with respect to these new areas.

As to the present situation, in Louisiana where we have had from the beginning ample authority and support, there was not a single pink bollworm found in the State in 1921. A most minute inspection has been maintained not only at the once inspected points but other points where there was any reason for suspicion.

Mr. Magee. How do you get rid of them?

Mr. Marlatt. In Louisiana? There was a noncotton zone established by the State as to all infested areas.

Mr. Magee. Do you destroy the insect? How do you get rid of it?

Mr. Marlatt. By stopping the growing cotton. The first step is to clear the land of all cotton and burn it. After that prohibit the growth of cotton for a period of two or three years. It does not normally live in anything but cotton. There is also maintained about the noncotton area a surrounding regulated zone. In Louisiana we had enthusiastic support from the planters, the officials, from the governor down, and the cotton factors—all were earnest in their efforts to help exterminate the pest. There has not been a pink bollworm found in the large area of three parishes in southwestern Louisiana in two years, and we are going to allow them to grow cotton there next year (1922), but still under regulation and control.

In Texas the Hearne district has not had a bollworm in it for five years. That has been cleaned up. The big area in the southeastern part of the State, known as the Trinity Bay district, has been only partly controlled because of inadequate legislation and indifferent cooperation on the part of planters. But nature has helped out. We had one year of perfect control, or nearly so, under general cooperation, State and planter. It was followed by a year of floods and rains and very inadequate other control, but the heavy rains took care of most of the area and the cotton was drowned out. There has been very little cotton grown since in that area. The one year of clean up and noncotton, followed by two unfavorable cotton years, has practically eliminated the pink bollworm. I suppose no work has been done more thoroughly than our field inspections of this large district this last fall and winter, 1921–22. It was made a condition of the Texas law that noncotton zones should be based on actual infestation. The total result of all this inspection was one infested boll in the entire district in connection with the crop of 1921.

The outlook for the extermination of the pink bollworm is more encouraging than ever before. We have apparently a cleanup in Louisiana. However, we do not guarantee it. It will require a lot of inspection in the future to make it certain. The State will maintain regulated areas for some time to come. There will be one noncotton zone in Louisiana, at Shreveport. Texas, under the new law, has already established noncotton and regulated zones. The same is true with respect to New Mexico. If we can keep up this work there is a fair chance that we can eradicate the pest: I think a better chance than we have ever had before.

The only points that are not now under full control are the western areas on the Pecos and Rio Grande Rivers. I say "not under full control." I mean not under the noncotton zone and eradication plan. These western areas are under full regulation, but in view of the proximity of these areas to Texas, and the likelihood of their reinfestation from Mexico, and the further fact that they are separated from eastern cotton in Texas by some hundreds of miles of semidesert, makes it possible to consider that as an isolated section to be taken up later. It is, however, being kept under regulation, and I mean by that that all of the cotton grown in it is under the control of Federal and State authorities. It goes in sealed cars to Galveston for export. This movement is followed and controlled at every step until it goes aboard the boat for export. The seed is crushed, and a mill clean-up is made. No clean-up of the fields is made. That would involve a very large expenditure, and the Government could not afford to undertake it as an annual proceeding, but only on the basis of eradication and noncotton areas. If we can eliminate the pest from eastern Texas and Louisiana, the next step will be to push it out of the country entirely, and it is quite possible that by that time Mexico may be willing to join us.

Mr. **Anderson**. Is this section in western Texas a commercial cotton-growing section?

Mr. **Marlatt**. It involves a high grade of staple, and is a development of considerable importance. Cotton is there grown under irrigation, which makes control much simpler.

Mr. **Lee**. These red spots [indicating] are in Texas, where they are found?

Mr. **Marlatt**. They represent the pink bollworm which occurs along the Rio Grande Valley. It is within a stone's throw of the river, and a short distance away comes the desert and broken grazing country. All the cotton grown in this bend district represents only 200 or 300 acres, just little patches of cotton. The big cotton development of the Rio Grande is the one southeast of El Paso. A good deal of cotton was grown there in 1920—some 20,000 acres. The year before there were 100 acres grown, and that was an experiment. Last year, 1921, I do not remember the number of acres, but about half that of the year before. The infestation there is just beginning, but if cotton growing is continued it will take probably only three or four years for the insect to become well established. The extermination of the insect there, if it is possible to exterminate it, will be simplified because the cotton is grown under irrigation.

Mr. **Anderson**. How about the reinfestation from Mexico even after you had cleaned up that area?

Mr. **Marlatt**. If conditions remain such that Mexican labor can walk across the river, carrying his bedding stuffed with cottonseed, and the pink bollworm in the seed, and his pockets more or less full of it reinfestation is bound to occur and those are factors which lead us to leave this area for the present under regulation. Extermination in this more or less border area is rather contingent upon the cooperation of Mexico. I think Mexico may come to that.

There are two courses we can take with respect to the pink bollworm. We can attempt to control it as to infested areas by regulation. That policy would mean that the insect would, sooner or later, and probably rapidly become widespread throughout the South. The other policy is to go ahead with our present effort to eradicate the pest. As to the cost of this eradication effort—the results have been worth the money a thousand fold as a control feature without considering eradication at all. With this expenditure of a few hundred thousand dollars a year, we have prevented widespread infestation by this pest throughout the South, and that is worth not a few hundred thousand dollars but possibly several hundred million dollars. This appropriation fund is a big item, $547,840, but we look upon it as an insurance fund, and we have so stated before this and other committees. I think we have never spent the full sum, but we have turned back into the Treasury every year a considerable item of the appropriation.

I have here a statement indicating the amounts appropriated for different years, and the amounts turned back into the Treasury. We have turned back into the Treasury $158,924, nearly $159,000, in the last three years.

As to the needs for this next fiscal year, the estimates, as I recall it, carry the statement that they should be considered as tentative. but they were not reduced very much. A small item of $7,000 was deducted tentatively. We are perfectly willing to stand on the item as it now reads. Both this year and next year we may need the full sum, especially in connection with the provision for cooperation with the States in reimbursement. I think the argument made by the Secretary for such cooperation is sound; in other words this pest is not a pest which threatens simply Texas and Louisiana and New Mexico. but the entire cotton production of America, and the argument is sound that Congress and the whole country should recognize it as a national matter and should join in its control.

The participation by the department is limited to one-third of the amounts paid by the States involved, and limited further by an acreage rate. It certainly was the one thing that secured from Texas the legislation which we now have. Without that promise of support by Congress, Texas would have given up the work and would never have taken the action and made the appropriations which she should have made.

Mr. Buchanan. You mean that she would have gone to sleep until it was too late to do any good. She would have made the appropriation after it was too late?

Mr. Marlatt. I do not know whether you were here when I started, but you have a man on your committee, a man who knows as much about this as I do, and who has presented a very informing statement to Congress about the pink bollworm.

Mr. Buchanan. Who was that?

Mr. Marlatt. You sir.

Mr. Buchanan. I thought you were referring to somebody who did do some good.

Mr. Marlatt. I do not know that I have anything further to say.

Mr. Anderson. As I recall, a year or two ago, under this subdivision here, which relates particularly to quarantine against Mexico, you were going to construct some fumigating sheds, I think. Was that done?

Mr. Marlatt. We come to that a little later on.

Mr. **Anderson**. I do not want to anticipate you.

Mr. **Marlatt**. That is the next subject.

Mr. **Buchanan**. Before you leave the subject, I would like to know if there has been any infestation in Mexico any closer than there has been heretofore?

Mr. **Marlatt**. I have received to-day a report of the investigation of the field inspection made along the border in Mexico. Thorough inspection was made in Mexico from a point above Del Rio, Tex.—that is half way up and beyond that there is practically no cultivation—to the mouth of the Rio Grande and the pink bollworm hitherto has been found in that area at one point that is opposite Del Rio.

In the first place, no pink bollworm has been found in that Rio Grande strip this year.

Mr. **Buchanan**. How wide is that strip?

Mr. **Marlatt**. The exploration covers any areas near the river where cotton can be grown, and running up from the rivers tributary to the Rio Grande 50 or 60 miles. Within 50 miles of the border there has been no pink bollworm found this year. I speak of 1921.

Montclova, about 60 or 80 miles inland, is the nearest point of approach of the pink bollworm to Texas, except at El Paso, in 1921.

A very thorough investigation was made in the cotton-producing district opposite Brownsville, Tex., and no pink bollworms or evidences of infestation were found. The Mexican planters along the Rio Grande have been frightened. They have been getting their seed from the United States, and they have been cleaning up their fields very well. At the old point of infestation opposite Del Rio, Tex., they have planted no cotton recently in any of the old invaded fields. They planted new land, and by so doing they have in a way put into effect the noncotton idea, and apparently the insect has been wiped out. all of which is very useful to us.

Mr. **Buchanan**. You mentioned awhile ago an alternative method of trying to control and not eradicate it. What is the matter with you? Are you changing your ideas?

Mr. **Marlatt**. Not the least in the world. We hold absolutely to the idea that it is an insect to be eradicated, until we find that we are beaten.

Mr. **Buchanan**. You still believe that you can eradicate it?

Mr. **Marlatt**. Yes.

Mr. **Buchanan**. By efficient and effective methods?

Mr. **Marlatt**. It looks like that to me from the present status. This Trinity Bay district carries more conviction to me than any other.

Mr. **Buchanan**. This Ellis County infection—is it to any extent? It is an enormous cotton country.

Mr. **Marlatt**. I was down there in Ellis County, and went over the district. The infestation there is very limited, indeed, like that at Hearne in 1917.

Mr. **Buchanan**. I remember that.

Mr. **Marlatt**. It is a repetition of that. A few fields which were tributary to a certain mill became infested.

Mr. **Buchanan**. How did that seed get ahead of the fumigation?

Mr. **Marlatt**. I have already explained that to the committee. Unless the committee would like to have me repeat.

Mr. **Ball.** The fact is that this came from a supposedly free district, from New Mexico.

Mr. **Marlatt.** It came from a district in New Mexico at Carlsbad, not at that time known to be infested.

Mr. **Buchanan.** Did that seed come from Mexico into that district?

Mr. **Marlatt.** From Mexico; yes. That infestation was determined there, and we believe we determined it the year it started. Only 16 worms were found in 2 fields, after an investigation of several hundred. As soon as infestation was found further movement of seed was stopped, and the cotton lint went out under safeguards and was exported. The seed movement which occasioned this new infestation occurred prior to the finding of the infestation at Carlsbad. I have already described the infestations which followed and the reasons for our belief that the two reported points are the only infestations that resulted.

Mr. **Buchanan.** I hope you can control it there, because that is the most intensive cotton district in the State.

Mr. **Marlatt.** Such control has been started under the new State law.

Mr. **Buchanan.** If the pink bollworm gets a foothold, it will cost a mint of money and be hard to control.

Mr. **Marlatt.** There is only one fly in the ointment in Texas. Your people down there are very economical and have not given us as large noncotton zone as we would have liked. The noncotton zones cover the invaded fields and a mile or so beyond, but large surrounding regulated zones have been established in which we control all the cotton produced, so that after all it is not bad, as we will thus have control over a very large area. There will be no cotton grown at all in the center of the area, and if the insect does appear it will probably be in the area under regulation, so that it is fairly favorable.

Mr. **Buchanan.** You have a good chance that it will not spread any?

Mr. **Marlatt.** We have never been in so favorable a situation as now. I am very much encouraged, and I think all of us are—the State, people, and everybody connected with the work. The pink bollworm may beat us out, but we are putting up the stiffest fight we can.

TO PREVENT MOVEMENT OF COTTON AND COTTON SEED FROM MEXICO INTO THE UNITED STATES.

We now come to the Mexican border control work that you asked about. That is a separate item of the same general appropriation for the pink bollworm. It covers the prevention of the further entry of the pink bollworm from Mexico into the United States, and it involves control, inspection, and disinfection of traffic between the Mexican Republic and the United States. It is a big proposition.

I would like to say something in passing of the young men back of the work, that they are an unusually earnest and fine body of men.

Mexico has been in a state of turmoil for many years, and the traffic with that Republic has been relatively small, but in the last year, due to the new state of affairs, the traffic is growing by leaps and bounds.

For example, in the 12 months ending last July we inspected 25,000 cars and fumigated 15,000 of those, in round numbers. In the last six months of 1921—that is half the time—we inspected 22,000 cars and fumigated 19,000 cars; in other words, we inspected nearly as many in the last 6 months as we did in the 12 months preceding, and we had to disinfect a larger number by about 4,000 cars. This is done under the authority given in the appropriation act, and under that authority the Secretary is authorized to collect fees. That is, it is made in a sense optional. The fees collected cover the actual cost of the chemicals used in the disinfection of the cars and the unskilled labor, and these fees are turned in the Treasury of the United States. This work would be largely self-supporting, if we had a revolving fund.

Mr. **Anderson**. What was the amount?

Mr. **Marlatt**. We have turned in as fees from the beginning up to now, a little over a two-year period, $176,232.

In the last six months we turned in $79,933, nearly $80,000.

The work has grown so that our remaining funds will not carry us to the end of the fiscal year, and we have submitted, and I believe it has gone in the estimate, an urgent deficiency item for $50,000 additional. This money is not lost to the Government. It goes into our hands and back to the Treasury, so that whatever we spend is in a sense a revolving fund, as it comes from the Treasury and goes back again, as to the main cost.

Mr. **Anderson**. If it takes you $50,000 additional for the current fiscal year, you could not do the next year for the same amount.

Mr. **Marlatt**. The board submitted a request for a similar increase for 1923, but I believe, under the rules, that does not come up for discussion. It will probably have to come up as urgent deficiency. To perhaps more correctly state our action, we called attention to the fact that we did need such an increase also for 1923.

Mr. **Ball**. We could not estimate now what next year would be.

Mr. **Marlatt**. We may need even more.

Mr. **Ball**. This will be enough to run through until December.

Mr. **Marlatt**. Yes. A deficiency will undoubtedly develop again.

Mr. **Anderson**. There will be a deficiency?

Mr. **Marlatt**. Yes, sir; unless revolution stops the traffic from Mexico to the United States.

Mr. **Buchanan**. The department realizes, of course, that unless this work is done effectively all over the country in fighting for the pink boll worm in the cotton belt the money already spent is wasted.

Mr. **Marlatt**. Absolutely. This is a fundamental and basic part of the work.

FUMIGATION HOUSES.

You asked about these houses. They have been constructed and are now in working order at all ports along the Mexican border—all the principal ports—at six different places. These houses are sufficient, the larger of them in blocks of three, to take 15 cars at a time. They are sheds which are solidly built, so that they are gas tight.

Very frequently 100 cars at a port are disinfected in a long day's work, and these men of ours down there work all hours in order to complete the work.

Mr. ANDERSON. How long does it take to disinfect one group of cars?

Mr. MARLATT. Approximately one hour and a quarter. They are kept under gas for substantially one hour.

Mr. ANDERSON. What is in the cars?

Mr. MARLATT. All the cars that come from Mexico have some cotton seed, several quarts, or as much as a bushel or more of cotton seed in each car. Apparently there is not a freight car in Mexico that has not been called upon to haul cotton seed. They do not clean out the cars, and this seed which we take out at the border and burn very frequently contains living pink bollworm larvae. The seed is apt to rattle down on the freight, or anything else that comes in the cars out of Mexico.

As a rule ore shipments are controlled by a different method. We have an arrangement with some of the ore companies that they shall have an officer whose business it is to see that the cars remain clean. and they come back so certified, and we reinspect them and they go through. The same thing is sometimes possible with lumber cars. where they go into Mexico, where there is no bollworm, and come directly back. But in the main the traffic has to be fumigated, both as to the Mexican cars that cross the border and the American car crossing into Mexico to take over Mexican freight.

It should be said also that in connection with this border-control work, the inspectors enforce other quarantines. We have various other quarantines in relation to Mexican fruits, to keep out the fruit fly, and with respect to sugar cane, potatoes, etc., to keep out various pests. These men inspect all traffic and intercept a good deal of contraband material.

During the 12 months ending July, 1921, 28,050 parcels of contraband were intercepted on the Mexican border. In the last six months of the year 31,592 were intercepted

The prevention of entry of pink boll worms also involves northern ports, namely, San Francisco, Seattle, New York, and Boston in relation to import cotton, which amount all the way from 200,000 to nearly 600,000 bales of cotton a year. This is a vast bulk of cotton. and is all disinfected by vacuum fumigation. Huge plants for this purpose have been built at the ports named, some of them capable of fumigating several hundred bales at a time. These are private plants, but are supervised to insure the work being done properly. Our inspectors supervise the fumigation of all that cotton in connection with their other port work.

Mr. BUCHANAN. Even though it does not go to the cotton belt?

Mr. MARLATT. A good deal of it goes to the cotton belt. There are important mills in Georgia and the Carolinas, which use foreign cotton, and there are mills that use cheap foreign cotton for mattresses. Those are scattered all over the country.

There is one other subject that has been assigned to the board, and that is the date-scale appropriation.

SURVEYS OF PINK BOLLWORM IN MEXICO.

Mr. **Anderson.** I was wondering if you would discuss these items specifically. There is an item to determine the actual distribution of the bollworm in Mexico, $10,000 to $8,000. Is that survey going to be continued?

Mr. **Marlatt.** It should be. I mentioned that a moment ago in relation to the border conditions that I described. It involves also surveys of other parts of Mexico in relation to lower California, for example. It is important to keep in close touch with the situation in Mexico as far as we can on account of the traffic with the United States. It is an appropriation of which we never spent the full amount, but there is a possibility that next year there will be a better opportunity for cooperation with Mexico, and the appropriation should remain.

Mr. **Buchanan.** That is pretty apt to be an annual appropriation?

Mr. **Marlatt.** It must be kept up. It is fundamental to the control work.

STUDY OF PINK BOLLWORM.

Mr. **Anderson.** You have an estimate of $5,000 to investigate in Mexico, or elsewhere, the pink bollworm as a basis for control measures?

Mr. **Marlatt.** That is the research item covering work in the Laguna, Mexico. It was originally $25,000, but we never spent more than $12,000, and at our request this item was reduced to $5,000 in 1921. After a brief interruption we began again last year a very thoroughgoing piece of work there, which is now under way, and which is yielding results of very great importance.

Mr. **Buchanan.** That is a study of the pink bollworm itself?

Mr. **Marlatt.** Yes; the means of controlling it in the field and in various other ways. The control of the pink bollworm has not so far been solved as a field proposition. It comes to a question in the Laguna of "trying to feed the pink bollworm and leave something for the planter." The best control is like the bollweevil control—early cotton.

Mr. **Buchanan.** Early cotton and intensive cultivation.

Mr. **Marlatt.** Yes, sir. To control it as they do in Laguna would be out of the question in this country. In Laguna they clean the fields and irrigate them. They are kept under water for a month or so; labor is cheap, and they can do a lot of control work in the way of cleaning up, and thus destroying a lot of the insects. They can do control work there somewhat as they do in Egypt. In Egypt they thoroughly clean the fields early in the fall; the cost here of such work would be more than the cotton would bear.

REIMBURSEMENT TO STATES FOR LOSSES ON ACCOUNT OF ENFORCED NONPRODUCTION OF COTTON.

Mr. **Anderson.** You have some new language on page 263, making available $200,000 for reimbursing the States' expenses incurred by them in connection with losses due to enforced nonproduction of cotton in certain zones in the manner and upon the terms and conditions set forth in Senate joint resolution No. 72, approved August 9, 1921, etc.

Mr. Marlatt. That is a part of the language of the resolution of August 9th?

Mr. Anderson. I understand that the basis of that operation is one-third for the United States and two-thirds on the part of the State.

Mr. Marlatt. It reads: "To utilize not to exceed $200,000 in reimbursing such States for expenses incurred by them in compensating any farmer for his loss due to the nonproduction of cotton in said zone: *Provided*, That such reimbursement of any State shall be based upon the actual and necessary loss suffered by the owner of said land; that such reimbursement shall not exceed one-third the amount actually paid to the State by any farmer, and in no event shall exceed $5 per acre; and that no reimbursement shall be made in respect of any farmer who has not complied in this way with all the quarantine and control regulations prescribed by said Secretary of Agriculture and such States relative to the pink boll worm."

I think it is desirable to continue that authority. As I remarked a moment ago, it was that provision which heartened the State of Texas to give us the legislation. They thought that if the Federal Government was willing to help them they should be willing to do something.

FOR EXTERMINATION OF DATE SCALES.

Mr. Anderson. Are there any questions on this item?

Take up item on page 266, eradication of the parlatoria date scale.

Mr. Marlatt. The date industry, I think, you know something about. The department's expert, who is really the father of this new industry, gave me this box of dates as an exhibit for you. I am not in the habit of attempting to influence the committee in this way, but it was sent down by Mr. Swingle as an illustration of the American-grown date. They put up these dates very artistically, but this is the loose or bulk form. The date industry began really about 10 years ago. A few date plants were imported by the Department of Agriculture in 1889, and these were sent out into southern Arizona and California at that time; and they carried with them, apparently, two scale insects, which stayed there and now are the principal pest in the date orchards. They would have had them anyway, and we can not place this responsibility on Mr. Saunders, the gardener of that period, for every subsequent importation of dates has brought these same insects in, and none can be made without bringing them in because they are widespread in the date countries of the whole world. If this industry had been started from seeds we could have escaped these pests altogether.

When the date industry began to show its value it was recognized that these scales had to be reckoned with. The Federal Horticultural Board was called upon to help in the matter by quarantine, and for several years an effort was made, by the assignment of one man, to eradicate the more important of the scales. Mr. Swingle and others of the Bureau of Plant Industry, in cooperation with whom the work was being done, are confident that the most important of these insects can be eradicated, and the reason for their confidence is expressed in this map [indicating].

This is the map of what is known as Coachella Valley. It includes Mecca and that whole desert strip, which is ideal for date culture. If you examine the map you will find a number of spots. There are 124 plantations of dates in that valley. Of these, 70 were infested when the work was begun. Sixty have been cleaned and 10 are left. There are three or four other points of infestation elsewhere, but the 10 that are left in this valley are important centers, and control is going on. It means that intensive inspection of the whole 124 plantations must be maintained for a period of years. It means radical, drastic control, where we find the disease. The control is to burn the plant, but not kill it. The burning is external and the date grows from the inside, and you can burn them nearly to the core without killing them. When they are so burned the scale is eliminated in 95 trees in 100 treated, and in a year and a half or two years after that such trees are producing fruit again.

Mr. ANDERSON. How was this scale transmitted?

Mr. MARLATT. With imported and other offshoots. It is desirable that this appropriation be continued for another year. I think frankly we ought to be able to show a practically completed job of eradication by another year, and maintain merely an inspection fund of $7,500 for the year following. If we can not show such reduction, it will indicate that the work is not being performed successfully, but I am confident it will be.

I am sorry I have no photographs here. There are two scales, one which is a leaf scale (Parlatoria). This is a scale which covers the plant with a fine ashlike deposit. This is not only injurious to the leaf but it also attacks the fruiting stems, and if it is uncontrolled it would largely eliminate the commercial possibilities of date culture in America.

The other scale insect is most of its life in the interior of the plant that is underneath the huge enveloping leaf butts. One can cut deeply into the base or stems of the date and still find the insect. Whether we can exterminate this other scale, known as red date scale, is an open question in my mind, but at least it can be controlled, and, fortunately, is not as much of a menace to the date as the Parlatoria. The persons who have had experience in date culture in California tell me that unless the Parlatoria scale is eliminated they are going out of business, but the other scale, the red date scale, can be successfully controlled by treatment. This map concerns the Parlatoria.

WEDNESDAY, FEBRUARY 15, 1922.

MISCELLANEOUS ITEMS.

STATEMENTS OF DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK, DEPARTMENT OF AGRICULTURE, AND MR. A. ZAPPONE, CHIEF, DIVISION OF ACCOUNTS AND DISBURSEMENTS.

INTERCHANGE OF APPROPRIATIONS.

Mr. ANDERSON. We will take up the item with respect to the 10 per cent provision—the interchangeable provision—which I think was omitted from the bill last year, page 246. You may proceed with this item, Dr. Ball.

Mr. BALL. This item has been carried in the agricultural appropriation bill for many years, very largely, no doubt, for the reason that the Department of Agriculture has to deal with subjects in which seasonal variation makes a tremendous difference in the amount of money necessary to carry out their work.

It is impossible to estimate the work that is to be carried on a year and a half in advance of the time of its operation. We make out our estimates in the bureaus in July of the year previous to the year in which we begin to spend the money. Of course, the expenditure runs over another whole year, so that the average period is a year and a half elapsing between the time of the estimate and the expenditure.

If this was a post office—the distribution of the mail—they could figure very close on the matter of how much mail would be handled during that period. If instead of that this is an item for the inspection of perishable fruits, there is no possibility of estimating the amount of perishable fruits that will be offered for inspection a year in advance of the time that that fruit crop sets on the trees.

For example, the freeze of about two weeks ago in California will probably double or treble the amount of inspection required on account of the frozen oranges coming to market. There is no way of our estimating a year and a half in advance, when a disastrous freeze is going to occur in an industry of that kind.

A drouth may change our entire plans on one of our field stations. Excessive rains may wash out some of our experiments so that they are useless and worthless.

We have the same factor in all our agricultural work that the farmer has in his operation; that is, it is a gamble, and this 10 per cent item, which is only provided for in case it is submitted to the Secretary of Agriculture and approved by him, has been used in the past with a great deal of discretion. Your statements have shown the use of this item, so that you have had the facts in regard to that, and it has shown that it has been used with care; that only where it was necessary for the economical and efficient handling of the business of the department that these cases have been made.

In the case of tuberculosis eradication it is impossible for us to tell in advance just how much money is going to be required for indemnities and how much for overhead work—the examination. If we have 10 per cent possibility of exchange, we can make that work come out more nearly even than we can if we did not have it.

We test a herd and we may find one cow infected with tuberculosis, resulting in a very small indemnity. We may find 150 infected. There is no way of telling in advance.

Mr. BUCHANAN. How extensive is this leeway of 10 per cent? How many bureaus does it cover? All of them or just a few?

Dr. BALL. All of the bureaus.

Mr. BUCHANAN. All of the bureaus in the Agricultural Department?

Dr. BALL. All the bureaus in the Agricultural Department, but subject to submission to the Secretary and approval of the Secretary for the transfer.

Mr. BUCHANAN. In other words, you could transfer 10 per cent from the tuberculosis bureau to any investigation that is pending authorized under the law?

Dr. BALL. It could be done if the Secretary approved it, but it never has been done.

Mr. BUCHANAN. I understand. I just want to know the real extent of it.

Dr. BALL. It is within the authorization of that fund in the bureau, and we never transfer it from one bureau to another.

Mr. BUCHANAN. You could do it, though.

Dr. BALL. No; I don't think so, not as the law is now.

Mr. ANDERSON. The transfer could only be from one item within the bureau to another item within the bureau.

Dr. BALL. Yes; with the approval of the Secretary.

Mr. ANDERSON. Under the general language of the appropriation, to the bureau.

Mr. ZAPPONE. Yes, sir. It says "the foregoing amounts for the miscellaneous expenses." This has been held to mean the general expense items of each bureau and the interchange may be made only between items for the general expenses of a particular bureau.

Mr. BUCHANAN. You can transfer from the Bureau of Animal Industry to the Bureau of Plant Industry?

Mr. ZAPPONE. No, sir.

Mr. BUCHANAN. Or the Bureau of Biology?

Mr. ZAPPONE. No, sir. At the time the general expense appropriations of the department were broken up into numerous subitems, this provision of law was put in so as to allow the bureaus a little more elasticity in the use of appropriations and not cripple their work, especially in the event of an unforeseen emergency. At that time there was one lump-fund appropriation for each bureau. Congress expressed a desire that these appropriations be broken up into subappropriations, and agreed to insert the transfer provision permitting a 10 per cent interchange between the various items. Under this provision an item can not under any circumstance be reduced in excess of 10 per cent of its total, and an item can be increased in excess of 10 per cent of its total only in case of an extraordinary emergency.

Dr. BALL. The general practice of all the experiment stations in the United States or other research institutions, I think, and of practically all business, is to set aside a reserve fund that is not appropriated in the first budget, but is held in reserve for emergencies. We have no reserve fund in the Department of Agriculture, and this 10 per cent clause would in a measure take the place of a reserve fund.

Mr. BUCHANAN. You also allow more than 10 per cent to be appropriated, but not more than 10 per cent shall be added to any one item appropriated except in the case of extraordinary emergency, and then only by written authority of the Secretary of Agriculture. In other words, if he certifies an emergency, you could spend more than 10 per cent? There would be no limit to it at all.

Mr. ANDERSON. I think that has never been used, except in one case.

Dr. BALL. I think that provision has never been used—in fact, the 10 per cent transfer has been very rare in the department.

Mr. BUCHANAN. But you could use more than 10 per cent?

Dr. BALL. In case of an emergency, yes. That would be an emergency.

Mr. ANDERSON. For instance, as I recall, the outbreak of the foot-and-mouth disease, I think there was quite a considerable amount transferred from the various items to the Bureau of Animal Industry—in the Bureau of Animal Industry, it might be stated—but I think a large amount was transferred at that time to take care of that outbreak, until an emergency appropriation could be obtained.

Dr. BALL. We do that in cases of forest fires, too. We use up our forest fire money and then the Secretary authorizes the expenditure of other moneys to carry that item until an emergency appropriation is made and it can be returned.

Mr. ANDERSON. Then it comes in as a deficiency. In the meantime you transfer funds from the other items to take care of it?

Dr. BALL. Yes. Then they are transferred back. I would suggest that never has a transfer of more than 10 per cent been made from an item without submitting a deficiency estimate to Congress to cover it. They can not do it. It would simply mean crippling the item to do more than that; but we do do more than that in case of a serious emergency like forest fires, or the foot and mouth disease, and that might have been so in the case of the citrus canker if it had arisen at a time when Congress was not in session.

Mr. ANDERSON. I really doubt if that clause carries authority to transfer more than 10 per cent. It is there by inference, but with a prohibition in the first part of it.

Mr. BUCHANAN. It says not more than 10 per cent shall be transferred, and then it provides that it shall not exceed, that it shall not be exceeded except in the case of a special emergency. It is only by inference that you could do it.

Mr. ANDERSON. The 10 per cent is interchangeable, on the order of the Secretary, but if it gets beyond 10 per cent it requires the written consent of the Secretary. I assume that even where transfers are made of less than 10 per cent that they are made with the approval of the Secretary.

Dr. BALL. The changes are submitted for approval, in every case. In this provision it says no more than 10 per cent shall be added to the item. That means that you can not take off from a half dozen items 10 per cent each and add them on to one item. You can not take off of an item of say a million dollars 10 per cent and add it on to an item of $5,000.

Mr. BUCHANAN. I see there is some doubt whether the Secretary could do it, under an extreme emergency.

Dr. BALL. It does not mean that he can take more than 10 per cent off. It means that he can not add more than 10 per cent to any one item. In one case the provision is for taking it off and in the other the provision is that you must not add more than 10 per cent.

Mr. BUCHANAN. Except——

Dr. BALL. Except in case of an extreme emergency.

Mr. BUCHANAN. Oh, I see your construction. You say you can not deduct but 10 per cent from any one item.

Dr. BALL. That is correct.

Mr. BUCHANAN. And you can not add the sum of those subtractions to any other item if it exceeds 10 per cent.

Dr. BALL. Ten per cent on that item, yes.

Mr. BUCHANAN. Except in the event of an extraordinary emergency.

Dr. BALL. Yes, sir.

Mr. BUCHANAN. To be so declared by the Secretary.

Dr. BALL. Yes.

Mr. BUCHANAN. I see. That seems to be a consistent construction.

Dr. BALL. That is one of the very important things to the department from the standpoint of efficiency and economy of work, so that we can allow for an adjustment, which is absolutely impossible to foresee, the length of time that our budget is made up in advance.

Mr. BUCHANAN. In an undertaking like we have on hand, in many instances, it would seem that it might be a wholesome provision if confined to the bureau which necessarily has all the related objects to attend to.

Dr. BALL. Yes; in which the provisions for the use of that money is germane.

Mr. BUCHANAN. There has never been in fact any of it used for increasing the salaries or anything like that?

Dr. BALL. Oh, no; that is not the intention of it.

Mr. BUCHANAN. It never has been used for increasing the salary of anyone, or anything of that character?

Dr. BALL. No, sir. I can not answer for it in times past, but I can answer for the years that I have been here.

Mr. BUCHANAN. And will not be, so far as you can tell.

Dr. BALL. Will not, as long as I have supervision of it, at least.

Mr. ANDERSON. Now is there anything further on this item?

Dr. BALL. So far we have not felt this omission, because we are only past the middle of the year, but it is going to be serious before the end of this year. With our reduced appropriations and the eliminating of this clause we are facing some very serious difficulties.

Mr. ANDERSON. Of course, I think naturally regarding the appropriations in this bill, it would be safer to hew to the line closely with a provision of this kind, and then you would probably be justified if you had no such interchangeable appropriation, in asking for a deficiency. In other words, if you do not carry a provision of this kind you have got to leave some leeway, even in every appropriation, at least in a good many of them, where it is obviously impossible to get a closer estimate. You have got to hew to the line a good deal closer than when you do not have these adjustments to make.

EXPERIMENTS AND DEMONSTRATIONS IN LIVE STOCK PRODUCTION IN THE CANE SUGAR AND COTTON DISTRICTS OF THE UNITED STATES.

Mr. ANDERSON. We will take up the item at page 250. Experiments and demonstrations in live-stock production in the cane sugar and cotton districts of the United States.

I wish you would tell just a little of what is being done down at this station at New Iberia and how it is developing.

STATEMENT OF DR. C. W. LARSON, CHIEF OF THE DAIRY DIVISION, BUREAU OF ANIMAL INDUSTRY.

NEW IBERIA, LA.—PRODUCTION OF LIVE STOCK.

Dr. LARSON. This station was established in 1914 for the purpose of studying whether or not it was possible to practice diversified farming in that sugar and cotton section, and the production of live stock was undertaken for that purpose. This station serves both as an experiment station and as a demonstration farm. Any of the problems that are being experimented with could serve as demonstrations to the people of that section of the country, especially the management problems that go along with the feeding experiments and so on, with the various crops.

The chief purpose there is to determine the crops that can be grown to the best advantage for feeding live stock, and, in general, which classes of live stock which can be grown to the best advantage.

There are four chief projects there: The dairy and hog project, the horse and mule project, the beef cattle, and the hog project. What we are trying to do is to grow the most live stock per acre.

In the steer work this year, for instance, we are comparing the various kinds of silage from crops that can be grown there, which includes feeding experiments, using corn silage, sorghum, sorghum and soy beans, Japanese cane and sugar cane. These are combined with rice polish, the rice growers grain, and rice bran; also cottonseed meal is used in the various mixtures, and the steers are kept in various lots and are fed these various combinations to determine the original purpose, namely, the greatest number of pounds of beef per acre.

Mr. ANDERSON. Is this experiment far enough along so that any conclusions can be drawn in the matter of producing and feeding cattle on an economic basis in this southern territory?

Mr. LARSON. I would hardly say so, because the biggest problem there is to grow the crop, and it has been uncertain and we have had very unfavorable years the last several years, and it has hindered the work very much. We have had some very unusually rainy seasons, and some dry ones making the crops almost impossible.

Mr. BUCHANAN. Where is this demonstration station located?

Dr. LARSON. At New Iberia, La.

Mr. BUCHANAN. The sugar cane crop is not uncertain down there, is it?

Dr. LARSON. No.

Mr. BUCHANAN. The sorghum crop is not uncertain, either, is it?

Dr. LARSON. All the crops in this section have been uncertain. This is down in the southern part. I would say that we have not gone far enough to establish that point as yet.

Mr. BUCHANAN. How many years have you experimented with it?

Dr. LARSON. It has been going on now eight years.

Mr. BUCHANAN. How long is it going to take you to determine whether or not it is a success?

Dr. LARSON. Well, it is hard to say how long it will take.

Mr. BUCHANAN. If you can not do it in eight years, I doubt if you can do it in a century.

Dr. LARSON. Possibly that is true. They have, however, determined many facts. There are a great many factors involved in growing live stock; there are a great many crops to be considered.

Mr. BUCHANAN. I understood that the crops are the main problem.

Dr. LARSON. That is right.

Mr. BUCHANAN. You have had eight years of it, and have not determined whether or not it is a success as to that yet?

Dr. LARSON. I would say that——

Mr. BUCHANAN (interposing). It is a very problematical success?

Dr. LARSON. I believe it is possible to grow crops for some classes of live stock, but just how successful it will be I do not know that we know.

Mr. BUCHANAN. You say "grow crops." You mean we might probably grow crops?

Dr. LARSON. Yes.

Mr. BUCHANAN. How many more years will we be called upon to make these appropriations to determine that fact?

Dr. LARSON. That is something I could not say; I do not know how long it will take. But the results that we obtain every year are very useful to the live-stock people in that section.

Mr. BUCHANAN. There are not many live stock in that section where that peculiar land is with water a few inches of the surface, is there?

Dr. LARSON. Not very much; no; it has been largely rice and sugar there.

Mr. BUCHANAN. Does any salt water get on the rice?

Dr. LARSON. It does on some parts of it.

Mr. BUCHANAN. In that section rice is not uncertain?

Dr. LARSON. No; but the price of the crop has been quite uncertain.

Mr. BUCHANAN. It would be uncertain if fed to cattle, when the cattle market is uncertain.

Mr. ANDERSON. I am just wondering if this proposition is not going to have to be relocated after a while.

Mr. BUCHANAN. Relocated or stopped.

Mr. ANDERSON. I think there is a big problem all along the coast plains territory to solve the working out in some satisfactory way the raising of live stock down there, and I am frank to say I do not think you are making a whole lot of progress with this, and if this thing is not rightly located it ought to be relocated.

There is no use of continuing this proposition and putting more money constantly into the demonstration down there on this project if it is not rightly located. Of course, it was maverick in the first place; it was born with the expectation that the elimination of duty on sugar would result in putting all the sugar people out of business, and something had to be done to provide utilization of those lands and preserving the investment that had been made in them. I think there ought to be something done on this thing.

NUMBER OF CATTLE.

How many cattle have you got at this station?

Dr. **Larson**. There are 42 steers each year on this feeding experiment which are turned over; besides that we have a breeding herd, which consists of about 35 mature animals, and the young stock, that is, the beef herd; them we have a dairy herd.

Mr. **Anderson**. How many are there in the dairy herd?

Dr. **Larson**. About 22 mature animals and about the same number of young stock.

Mr. **Lee**. What kind of stock?

Dr. **Larson**. Jersey and Hereford beef cattle, and some Brahmin beef crosses.

BUILDINGS.

Mr. **Anderson**. Do you have the figures as to what the total investment in buildings is at this time?

Dr. **Larson**. Yes, sir. We have $8,100 in administrative cottages, office, warehouse, and bridge. Then in the pumping plant, water lines and fence, and electric light plant there are $14,000. In the dairy project, including the dairy barn, feed barn, milk house and calf barn, silo and herdsmen's cottage and fencing, $11,000.

In the beef project we have one cottage for the herdsman, two beef-cattle barns, two Negro cabins, and eight silos, and the equipment for the different cattle lots, making a total of $16,000.

In the hog project we have one cottage, hog-feed house, one Negro cabin, hog cots (32), and the fencing equipment, making a total of $4,000.

In the horse and mule project, we have a horse and mule barn, jack shed, hay barracks, two Negro cabins, and the yards and fencing for the horse and mule project, making a total of $5,500.

Then in the implements and machinery, the tool house and all machinery, including tractors, etc., a total of $5,500.

Mr. **Anderson**. In other words, there are $66,000 or $67,000 invested in that place down there?

Dr. **Larson**. Yes, sir.

Mr. **Buchanan**. Out of a total appropriation of $462,000?

Dr. **Larson**. There has been turned back into the Treasury each year from $7,000 to $20,000.

Mr. **Buchanan**. Do you know what the total amount turned back into the Treasury is?

Dr. **Larson**. Last year it was $7,067, and there was actually expended $46,000. So that the net expenditure on the farm was a little less than $40,000 last year.

Mr. **Buchanan**. Can you give the total of all the appropriations which have gone back into the Treasury?

Dr. **Larson**. I do not have those for the back years here, but some years it has gone as high as $20,000, when more steers were fed and turned over.

ROADS.

Mr. Anderson. Was there any money spent last year on improving the road?

Dr. Larson. Some for graveling the road this year. The road is about a mile long leading to the main road, and, being a demonstration farm, a great many people drive in there, and it is unsafe for a car to drive over. So they bought some gravel from the county and put it on the road.

Mr. Anderson. How much did it cost to fix that road up?

Dr. Larson. The item covered the actual expense at county rates of enough gravel to make the road passable and safe. About $4,000 has been spent for gravel.

Mr. Anderson. I think the estimate last year for that gravel job was $7,500, and I think we had a small increase, but I do not think we had in mind graveling that road at all.

Mr. Lee. How far is this farm from New Orleans?

Dr. Larson. About 40 miles west, on the Southern Pacific.

Mr. Lee. How far is that above the sea level?

Dr. Larson. All the way from 2 to 6 feet. The low part of it overflows sometimes.

Mr. Anderson. Does the Government own this land at New Iberia?

Dr. Larson. No; it belongs to the State.

Mr. Buchanan. Is the State contributing anything to help you?

Dr. Larson. The director of the experiment station is on the committee. The State has also paid some rent for pasture and done chemical work in connection with experiments.

Mr. Buchanan. I know, but is the State contributing any money?

Dr. Larson. Only as above stated.

EXPERIMENTS IN DAIRYING AND LIVE-STOCK PRODUCTION IN SEMIARID AND IRRIGATED DISTRICTS OF THE WESTERN UNITED STATES.

Mr. Anderson. Mr. Larson, you can now take up the item for experiments in dairying and live-stock production in semiarid and irrigated districts of the Western United States. Is this the Woodward proposition?

Dr. Larson. No.

ARDMORE, S. DAK., AND HUNTLEY, MONT., STATIONS.

Mr. Anderson. Where is this project?

Dr. Larson. The dairy-cattle work is being done at Ardmore, S. Dak., and Huntley, Mont., and hog and sheep work at these farms and at Newell, S. Dak., and Mitchell, Nebr. In 1917 this appropriation of $40,000 was made to undertake live-stock studies on farms already established by the department. It was found after several years of investigation that there were certain crops that they could grow to advantage in the irrigated and semiarid sections, but that many of these crops could not be marketed as such. It was for that reason that the live stock was added to these farms that had already been established. The appropriation of $40,000 was divided, $28,000 for dairy projects and $12,000 for steers and hog projects, until this year, when it was changed to $20,000 for each.

The first year a dairy farm was established at Ardmore, S. Dak., in this dry-land country, and the following year a similar station was established on the dry-land and also irrigated section of Huntley, Mont. Both stations were previously run by the department. The investigations on these farms have consisted of feeding experiments with various kinds of crops that can be grown there and pasture experiments. We are trying various kinds of grasses that can be grown both at Ardmore and at Huntley and are trying to determine the amount of milk that we can produce per acre with these various crops.

At Huntley Station the pasture work has been largely irrigated pasture, and we have made some very good progress there with it. A number of special feeds have been studied, such as, for instance, sunflower. In that section a greater yield can be obtained per acre with sunflowers than with corn silage, and we are experimenting to see whether or not we get the actual returns in greater quantity from the sunflower silage than from the corn silage per acre.

Mr. WASON. That is with beef cattle?

Dr. LARSON. That is with dairy cattle.

Mr. BUCHANAN. What is the result of that experiment?

Dr. LARSON. We find as the result of experiments with the sunflower silage that there is apparently not the advantage in the growing of these sunflowers as was previously thought. The additional weight is not so valuable as was thought.

Mr. BUCHANAN. Additional weight?

Dr. LARSON. You can get more tons per acre of the sunflower than you could corn silage, but you do not get more milk per acre. That has been the experience so far.

Mr. ANDERSON. Can you grow corn in that part of the country?

Dr. LARSON. At Ardmore?

Mr. ANDERSON. Yes.

Dr. LARSON. Some years we have been very successful with it. We can grow some of the sorghums.

Mr. LEE. Can you grow sunflowers every year?

Dr. LARSON. Usually, and we have always grown it at Huntley. This year we got practically nothing at Ardmore.

Mr. BUCHANAN. What is your experiment relative to growing sunflowers and feeding the cattle on it? Can a farmer come out even and make a little?

Dr. LARSON. In that section they have not made much of anything for a great many years.

Mr. ANDERSON. Is this a dry-land investigation, or is it an irrigated proposition?

Dr. LARSON. At Ardmore it is dry land and Huntley is an irrigated proposition. At Huntley we have both some irrigated and some dry land.

The point is that there is a big strip of country that is occupied. and people have been trying to make a living there and they have not succeeded very well, and the department succeeded in growing some crops to pretty good advantage up there and now we are trying to see whether or not we can utilize those crops in feeding live stock.

Mr. BUCHANAN. How many years is it going to take you to complete that?

Dr. LARSON. That I could not say; it never will be completed.

Mr. **Buchanan.** Do you mean to say that it will never be demonstrated whether or not the citizens can cultivate that soil with the methods you recommend and make a living on it?

Dr. **Larson.** Oh, we could do that now; but whether you could get as good a living or make it more advantageous is something that will take longer to determine.

Dr. **Ball.** There has been, as a result of this work, a large increase in the live stock on the dry farms, already, has there not?

Dr. **Larson.** There has been some.

Dr. **Ball.** And there has been an organization of high-bred cattle through that whole country as a result of this work largely?

Dr. **Larson.** Through the Ardmore section not so much as the other section. There has been less around Ardmore than elsewhere.

Dr. **Ball.** But Ardmore, you understand, was chosen for experimental work because it represented a border line of successful farming, and it is a harder problem to undertake to expand that border. This was a dry-farm experiment station long before this live-stock work was put there.

Mr. **Buchanan.** Are there many people out there?

Dr. **Larson.** It is rather sparsely settled. It was homesteaded a good many years ago. A good many of those people simply gave it up.

Mr. **Buchanan.** What is the population section out there; 10 square miles or bigger than that, say, a county in extent; 400 or 500, or not that many?

Dr. **Larson.** This particular county where this farm is there would be more than that, because 300 or 400 people live in the town near by.

Mr. **Buchanan.** How many employees have you there working for the Government on these farms?

Dr. **Larson.** We have three for the live-stock work, and I do not know how many the Plant Industry have.

Mr. **Anderson.** Both of these stations are joint projects between the Bureau of Animal Industry and that of Plant Industry?

Dr. **Larson.** Oh, yes.

Mr. **Anderson.** And the problems of production of crops, as well as the utilization of those crops for dairy and beef cattle raising, are undertaken by both bureaus there?

Dr. **Larson.** Oh, yes, sir.

Mr. **Buchanan.** Do the States contribute in money?

Dr. **Larson.** No, sir.

Mr. **Buchanan.** Is it privately owned land?

Dr. **Larson.** It is land that has been leased to the Government.

Mr. **Buchanan.** It is privately owned land, then?

Dr. **Larson.** Yes; or State owned. At Huntley it is on the reclamation project.

Mr. **Buchanan.** You mean Federal Government land?

Dr. **Larson.** Yes, sir. In this connection I would like to say a word about the situation in South Dakota. One of the ideas was to make it possible for those people to live every year, even in years when they have failures and do not get anything. They have been "existing" some years, and what we did when we started the live-stock farm was to put in the silos, digging holes into the ground, and when we had a good year we would put in enough silage so as to last for at least two years, and that came in well this year, because we got no crops last year, and still we are able to keep our herds on that silage; and if those farmers up there could get that lesson of putting away enough roughage in good years—and they do have good years—to carry them over these lean years they could be very materially benefited.

Mr. BUCHANAN. Is it not quite expensive to construct silos under ground?

Dr. LARSON. No; it is a very cheap method out there.

Mr. LEE. How long will that silage keep under the ground?

Dr. LARSON. We are opening up silage now that we put in the silos four years ago, I believe.

Mr. ANDERSON. Is it in good condition?

Dr. LARSON. Right good condition.

Mr. WASON. How many acres of land have you at the Ardmore project that you utilized?

Dr. LARSON. We are getting the crops from the Plant Industry Farm, do you not see, and in addition to that we have about 50 acres of pasture that we are running experiments on. Then, they also rented at a very small rent a large field for the beef calf cattle pasturage experiment work at Ardmore.

Mr. BUCHANAN. How many head of cattle have you out there?

Dr. LARSON. We have about 25 head of matured dairy animals and about 18 young stock.

Mr. BUCHANAN. Forty-three in all?

Dr. LARSON. The steers are not owned by the Government, but are owned by the farmers in the community, who loan these to the station for experimental purposes.

Mr. BUCHANAN. And they get the benefit of any improvement made on them?

Dr. LARSON. They get the benefit of the improvements.

Mr. BUCHANAN. Is this $40,000 all spent by you on the live-stock industry, or does a part of that go to Plant Industry?

Dr. LARSON. That is for the live-stock work, with dairy cattle. beef cattle, sheep, and swine on the five farms.

Mr. BUCHANAN. Do you know how much the Plant Industry spends, whose feed you utilize in feeding stock?

Dr. LARSON. I do not know.

Dr. BALL. We have a large number of stations. This Ardmore station is just one of a series of stations.

Mr. BUCHANAN. How much, I was trying to get at, is the cost of conducting the experiment with 43 head of cattle and 25 privately owned cattle?

Dr. BALL. Our expenditure of money is not for dry farming; it is independent of that. We are carrying on investigations of dry farming, and only turning over incidentally to this live stock the finished product of our experiments.

Mr. BUCHANAN. Of the dry farm?

Dr. BALL. Of the dry farm.

Mr. BUCHANAN. But you are indulging in dry farming for experimental farm purposes, but turn over all the feed for feeding this stock?

Dr. BALL. As needed for that purpose.

Dr. LARSON. I could tell you exactly what the budget is for the year for any one of the stations.

Mr. BUCHANAN. I would like to know.

Dr. **Larson**. Take Ardmore station, for instance. The salary of the herdsman is $1,800; unskilled laborer, $1,200, and one other laborer at $1,200; equipment, repairs, and materials for the barn and milk house, $400; special feeds that are purchased, including some cottonseed meal and some bran and corn, and, as I said, because we did not get hay this year we are obliged to buy some hay, and the total expense for feed for all of the dairy stock is $1,800.

Mr. **Buchanan**. That is purchased?

Dr. **Larson**. That is purchased.

Mr. **Buchanan**. Eighteen hundred dollars worth of feed was purchased for the live stock this year?

Dr. **Larson**. Yes, sir.

Mr. **Buchanan**. You mean half of the year?

Dr. **Larson**. No.

Mr. **Buchanan**. This last fiscal year?

Dr. **Larson**. Yes, sir. We had some sales. Then there is the matter of coal, drugs, freight, veterinary service, repairs to fences, and so on, making a total for the dairy work for the one station of $8,500.

Mr. **Buchanan**. This station does not use the $40,000?

Dr. **Larson**. No, sir. This is only $8,500——

Mr. **Buchanan** (interposing). Of that $40,000?

Dr. **Larson**. Yes, sir.

Mr. **Buchanan**. And the balance of it goes to other stations?

Dr. **Larson**. Yes, sir; and for the other kinds of live stock.

Mr. **Buchanan**. These two stations do not use the entire amount?

Dr. **Larson**. No, sir; the other dairy station uses $10,000 this year.

Mr. **Buchanan**. Where is it?

Dr. **Larson**. At Huntley, Mont., on the irrigated farm.

Mr. **Buchanan**. If these two stations use $18,000, where does the other go?

Dr. **Larson**. For the steer, sheep, and hog work on these and the three other farms.

Mr. **Buchanan**. How much of it? Was any more than $18,000 of it spent last year?

Dr. **Larson**. Yes, sir; there was in addition to the $18,000 spent on these two dairy projects work done by the Animal Husbandry Division with hogs, sheep, and beef cattle at these two stations and at Newell, S. Dak., and Mitchell, Nebr.

Mr. **Buchanan**. Is that an experimental station?

Dr. **Larson**. This work is all done on farms already established by the Government, at which they have been carrying on crop studies.

Mr. **Buchanan**. Do you contemplate any periods within the next four or five or six or ten years that you will complete the experiment in that section and will some other sections have experiments opened up?

Dr. **Larson**. That is a policy I have nothing to say about. Of course, there is no end of information that you can work out at a station that will be useful to the community.

Dr. **Ball**. That is the policy of the department. We have a certain number of branch experiment stations, and those stations have been located with reference to the different problems of the region. Some of them may want to be changed from time to time, and the type of work that we do on those stations will necessarily vary from time to time, but it will probably be necessary through this plains area, where there is the opportunity for probably the greatest land development that there is in the United States to-day, to maintain a series of experimental stations to run all the way from Texas to Montana; and whether you will continue live-stock work will depend on whether live-stock work is successful and offers opportunities sufficient to make it worth while to continue experiments and to further develop that.

Mr. BUCHANAN. Do you contemplate increasing or getting through experiment stations in other portions of the country as the years go by?

Dr. BALL. We will contemplate changing from year to year as problems come up the places where we carry on experimental work. I hardly think I would be justified—I am in charge of that phase of the work now, but I do not think I would be justified in outlining a policy for the future. But in general we would wish to say that the development of experimental stations and of work in the future will be very much more largely in connection with States, and if we establish new branch stations for work in the future it will be on stations probably owned by the State or by us in cooperation with the State rather than independently.

Mr. BUCHANAN. I indorse that policy. Here is the idea: if you are going to continue every experiment station established throughout the United States and not establish any more, then that particular section or locality having peculiar soil and climatic conditions will be the sole beneficiaries from the expenditure of all experiment money. If you are going to continue those stations throughout the years that would preclude the establishment of any more without getting the Federal Government expenses so top-heavy that it will finally become a burden—I say, if you are going to keep every experiment inaugurated and inaugurate new ones, the time will come when the people will rebel.

Dr. BALL. We understand that. But, on the other hand, the problems that we work out, at, for instance, Ardmore Station, may be just as applicable to some place in Oklahoma or even in Texas as they are to Ardmore.

Mr. BUCHANAN. Not "apt to."

Dr. BALL. Yes; are apt to be. That is a problem of moisture conservation and the regions in which some relative amount of moisture is available by the regions which will benefit. It will be likely of no benefit to Maryland, because the problems we are working on are problems of the arid regions, problems of moisture conservation in the soil, and the crop result is only one of the results.

Now, it is the adaptation of a crop to that kind of a climatic condition—a thousand of those problems. We have already, as a result of this work, which has been going on now for 15 years, whole prosperous towns and communities where there was nothing but sage brush, and where attempt after attempt had been made to establish agriculture, and they have all been failures simply because they had not solved the problem of holding the moisture in the soil. So this series of experimental stations are in no sense local; they were chosen from the fact that they were representative.

Mr. BUCHANAN. I can see where you find the same amount of moisture and the same climatic conditions and the same soil elements or constituents in Oklahoma and Texas that are in this section of the United States that the problems solved up there would be solved for that particular community where it had the same soil constituents, climatic conditions, and the same moisture. But otherwise, you will find lots of variations.

Dr. BALL. That is why we have stations extending from Amarillo, Tex., on the south, to Montana on the north, which are engaged in solving these series of problems, and what we find out at one station we use to-morrow as applicable on all these stations and make it available to the entire region, not only that region but on the west side of the mountains, the intermountain regions.

We have nothing to say about one or two of these stations. They were located like the one we were discussing and others we may discuss. But these stations we are discussing at this time were chosen after years of study of this problem, and the particular location of the station.

Mr. BUCHANAN. I am not objecting to the location or the studying. The only thing I am saying is that there seems to be no end to it. You ought to solve those problems—you have the same climate and soil—why not open up some place else, where you have different soil and moisture conditions?

Dr. BALL. The idea would be that you think we are not now covering different regions of the United States?

Mr. BUCHANAN. I certainly do not. I think the other regions have never been covered, never have had any services from this character of work, and that when you work here 10 or 15 years and solve the main problems and the people understand them you ought then to move the stations to other places having different soil, climate, and moisture conditions and solve the problem for that section.

Dr. BALL. It will be a great deal cheaper and more efficient to take the particular problem of a given locality and in cooperation with the farmer, or with some State station, or with some institution, work up the particular application of that problem than it will be to establish other stations at a cost of a great deal in time and money in getting them equipped to do the work.

We have just had an illustration of this in the station in Louisiana, which cost $67,000. How much experimental work we could have done with that money. So we had better be careful in the location of the station in the first place and have it typical of a large region, and then continue to do the work and solve the problems.

Mr. BUCHANAN. To illustrate my point, you have two stations in one State—Ardmore and Huntley?

Dr. BALL. They are in two different States.

Mr. BUCHANAN. Two different States, but the same character of country.

Dr. BALL. No; Huntley is irrigation, on the reclamation project.

Mr. BUCHANAN. Irrigation and dry land?

Dr. BALL. Huntley is irrigation. On the land that is not irrigated you can not carry on dry farming.

Mr. BUCHANAN. Then one station would have been sufficient out there, according to your own statement?

Dr. BALL. That is your statement.

Mr. **Buchanan.** Did you not say a while ago that you work out the problems and apply the result to other sections?

Dr. **Ball.** I said we had a series of stations extending from Texas to Montana in order to be able to work out the problems as varied as their location.

Mr. **Buchanan.** One station could have worked out the problem for the others. You have got the dry land States?

Dr. **Ball.** The dry land section of Huntley is not typical; that is an irrigation station and was chosen for the irrigation work. It would have been very unfortunate to have centered the arid farm investigation in that region.

Mr. **Lee.** I will tell you one objection I have; I do not think you ever ought to put permanent improvements on somebody else's land.

Dr. **Ball.** We have an indefinite lease on the land in most every case. Where it is State land we have can it for 10,000 years.

Mr. **Lee.** A dollar perhaps would give you title to anything you wanted for that purpose.

Dr. **Ball.** In my experience we have never had any trouble at all in getting the land.

Mr. **Lee.** No trouble getting the land, but when you get through you have the trouble of selling buildings.

Mr. **Buchanan.** Do you find it cheaper to experiment with other people's cattle than Government cattle?

Dr. **Ball.** You would have to put up an appropriation big enough to buy all of those cattle?

Mr. **Buchanan.** Big enough? You have turned back a considerable sum of money into the Treasury for years and given the farmers the benefit of that feed on his stock.

Dr. **Larson.** They had the benefit of that pasture, which did not cost very much.

Mr. **Buchanan.** You used them in feeding their stock.

Dr. **Ball.** The question is whether you are going to carry those cattle through the winter at an increase or decrease.

Mr. **Buchanan.** If there is going to be a loss to buy the cattle, then stock raising is a failure. If the owner can carry it through the winter, you can carry it through.

Dr. **Ball.** Then you have solved a good deal of a problem there; that is, the problem of carrying the animals through, I think you will all appreciate that dry farming, where you can not have livestock, does not build homes and does not build communities. What we are trying to do is to make this an actual home neighborhood, and if you are to make actual homes, you have got to solve the problem of maintaining livestock on the land.

WOODWARD, OKLA., FIELD STATION.

Mr. **Anderson.** We will now take up page 252, field station, Woodward, Okla. Tell us something about what is being done down at this station, Dr. Larson.

Dr. **Larson.** This station at Woodward, Okla., is established on a piece of land purchased by the city of Woodward, Okla., and leased to the Government for 99 years to conduct live-stock investigations and demonstrations. This farm is 160 acres. This appropriation was first made 3 years ago, and there was no provision for building, and it could not be started. Last year $3,000 was included for building and the farm was then gotten under way and the necessary sheds to house the live stock were built. This farm is located about a mile from the town of Woodward, and there is no place for the herdsman to live nearer than the town, and it is for that reason that $2,500 increase is asked for in this appropriation to erect a herdsman's cottage so he can be near the cattle.

Mr. BUCHANAN. How many cattle have you there to herd?

Dr. LARSON. We have 12 cows and the young stock.

Mr. BUCHANAN. You have got a man at $2,200 to herd them?

Dr. LARSON. We have got a man at $2,200 to look after those cattle.

Mr. BUCHANAN. What is the value of those cattle?

Dr. LARSON. Those cattle cost $6,000 for 12 animals, laid down.

Mr. BUCHANAN. $6,000?

Dr. LARSON. Yes, sir. They are pure-bred Holstein cattle. The man in charge does get this salary, but he is more than a herdsman; he has training that fits him for experimental work and also makes him valuable as a demonstrator, because he can work with the farmers in the community and give them the lessons he works out at the station.

Mr. BUCHANAN. Have you a man to attend to the chickens?

Dr. LARSON. That is for the poultry experimental station.

Mr. BUCHANAN. How many chickens have you got?

Dr. LARSON. We haven't any.

Mr. BUCHANAN. Poultry, then?

Dr. LARSON. We have not any poultry as yet—that is for next year—and no man; this is the estimate for the coming year.

Mr. BUCHANAN. Seventeen hundred dollars would buy a good many chickens, would it not?

Dr. LARSON. Yes, sir.

Mr. ANDERSON. Is the chicken problem any different in Woodward than anywhere else?

Dr. LARSON. The feeding problem; kinds of feeds they can grow there.

Mr. ANDERSON. What is the nature of the questions you are studying with reference to live stock at this station?

Dr. LARSON. Our dairy herd is the only one that is now there, and we are carrying on experiments with the pasturing of wheat to determine whether or not that is as advantageous as actual barn feeding with the kinds of crops we can grow there. It is common practice there to pasture cattle on wheat, and we have a group that we are pasturing this way and a similar group that we are feeding, on the various crops we can grow.

Mr. ANDERSON. Is this an actual farm, and are you raising crops on it and utilizing the whole farm?

Dr. LARSON. It is all planted now; yes, sir. We just got the farm this past summer.

Mr. BUCHANAN. How many acres are there in the farm?

Dr. LARSON. It consists of 160 acres.

Mr. WASON. Did you give the number of cattle that you had?

Dr. LARSON. We have 12 pure-bred cows and the young stock and a pure-bred bull.

Mr. **Wason**. And the 12 head cost $6,000?

Dr. **Larson**. Yes, sir; and they are worth every cent of it. We could sell them for more than that.

Mr. **Wason**. What breed?

Dr. **Larson**. Holstein, well bred.

Mr. **Lee**. If they are highly bred, I should think they are worth it.

Dr. **Larson**. Oh, they are worth it.

Mr. **Buchanan**. Is there any problem about keeping the stock alive out there in this section?

Dr. **Larson**. No special problem, if you give feed to them. But it is like the other farms, we are trying to learn the most milk we can produce to an acre with the various crops.

Mr. **Wason**. How much poultry have you got?

Dr. **Larson**. The poultry project has not been started.

Mr. **Buchanan**. Is there anything peculiar about that section, about the development of the poultry culture, from any other section? We all know what poultry eats.

Dr. **Larson**. Yes; but we do not know just the crops that will grow to the best advantage to feed the poultry in every section, and that is one of the problems they will work on.

Mr. **Buchanan**. That is not so much the matter of establishing a chicken yard as seeing what they can feed.

Dr. **Larson**. That is it absolutely.

Mr. **Buchanan**. It looks to me like poultry eats the same feeds everywhere, and you know already what they need.

Dr. **Larson**. But you do not know how advantageous those feeds are that you can grow in the particular locality, and there is constantly new feeds that are being developed that are being tried out in those dryer countries.

Mr. **Wason**. I notice you estimate a poultryman at $1,700 a year.

Dr. **Larson**. Yes, sir; he is a trained, college man who knows the science and art of poultry husbandry. He knows how to carry on experiments and interpret results and also demonstrate.

Mr. **Wason**. He is a scientist?

Dr. **Larson**. Yes, sir; as well as being a practical poultry man.

Mr. **Wason**. And you intend to conduct experiments in poultry raising, egg production, and fowls for market?

Dr. **Larson**. Yes, sir; with the various crops that can be grown in that section.

Mr. **Wason**. That is a proposition for some other department than this, raising crops?

Dr. **Larson**. This is adjoining a farm that is already run by the Plant Industry Bureau, and they also produce the crops for the live-stock project.

Mr. **Wason**. All your poultry man does is to act as a scientist on poultry?

Dr. **Larson**. Exactly.

Mr. **Wason**. He is not a scientist on raising crops; is he?

Dr. **Larson**. No, sir; but he has to work with the crop man and get the results of the crop work. Either one alone would not be successful. He could grow a crop and not know how useful it would be for poultry feeding.

Mr. **Buchanan**. He could grow a crop and feed it to chickens like they do cattle?

Dr. LARSON. He would not have any definite results.

Mr. WASON. Your herdsman, I see, has estimated annual salary at a maximum of $2,200?

Dr. LARSON. Yes, sir.

Mr. WASON. You have two of them?

Dr. LARSON. One is a helper.

Mr. WASON. One is a helper and he gets $1,680?

Dr. LARSON. Yes, sir.

Dr. BALL. That is our scientific man?

Mr. WASON. What particular branch of science?

Dr. BALL. Studying animal nutrition and breeding, along those lines.

Mr. WASON. Have they been conducting experiments in feeding to produce milk at this station?

Dr. LARSON. That is right.

Mr. WASON. How many such places or experiments is the Department of Agriculture conducting at the present time?

Dr. LARSON. Four with dairy cattle; that is all I can answer for.

Mr. WASON. There are experimental stations in the different States doing the same thing?

Dr. BALL. This work is being carried on cooperatively with the State of Oklahoma.

STATEMENT OF MR. A. ZAPPONE, CHIEF, DIVISION OF ACCOUNTS AND DISBURSEMENTS, DEPARTMENT OF AGRICULTURE.

PASSENGER-CARRYING VEHICLES.

Mr. ANDERSON. Now, there is an item on page 253 with reference to passenger-carrying vehicles. You are proposing an increase of $35,000 in the amount, and a change in the language.

Mr. ZAPPONE. This carries no appropriation, but is a limitation on the amount that may be expended from lump-fund appropriations for the purchase, maintenance, repair, and operation of vehicles. This provision of law is necessary because of a general statute passed by Congress in 1914 requiring specific authority for the purchase and maintenance of motor-propelled and horse-drawn passenger-carrying vehicles outside of the city of Washington. You will note that this provision refers only to vehicles for use outside of the city of Washington.

Authority for the purchase of vehicles was carried by this item since 1915 until it was stricken out in the act for 1921. The continued elimination of this authority will seriously interfere with the work of the department. The purchase of new machines has now been suspended for two years and the department feels that to defer such purchases for another year will increase maintenance costs on old machines to a point that will be prohibitive.

The amounts required for the purchase and maintenance of vehicles have been very carefully worked out and are indicated in detail on pages 254 to 258 of the committee print. That statement also indicates the number of machines to be purchased, the bureau for which intended, and the public purpose for which used. On page 258 will be found a general summary.

You will see that for the maintenance of machines $73,824 will be required and $17,735 for the purchase of new machines, making a total of $91,559 for the purchase and maintenance of motor-propelled vehicles.

For horse-drawn vehicles $100 will be required for purchase and $990 for maintenance, or a total of $1,090, making a total for all purchases of $17,835, $74,814 for maintenance, and a grand total for purchase and maintenance of all vehicles of $92,649.

The use of $95,000 has been asked so as to leave a small balance to take care of emergency cases that could not be anticipated at the time the estimate was prepared.

Mr. ANDERSON. I wonder if you would pick out of this list, beginning on page 254, the bureaus for which new purchases are to be made, and the purpose for which they will be used?

Mr. ZAPPONE. Yes, sir. It is in this summary here [showing]. Do you wish a statement separately?

Mr. ANDERSON. No.

Mr. ZAPPONE. It is on page 258.

Dr. BALL. The purpose for which used is not there, is it?

Mr. ZAPPONE. The purpose for which used is shown on page 257. It is set out in full.

Mr. BUCHANAN. Perhaps the record ought to show the number of cars to be purchased, and the bureau where it is to be used, and the price of each.

Mr. ZAPPONE. This schedule on page 257 shows that.

Mr. BUCHANAN. I have not found the prices of each.

Mr. ANDERSON. Yes, it says "net cost." The item is what they expect to pay either for the machine new or for the machine including the exchange of old machines.

Mr. BUCHANAN. I find five of them here, and it gives the gross cost, but that is all I find. $17,000.

Mr. ANDERSON. For instance, on page 257 you will find "eradication of tuberculosis"; they expect to buy 10 automobiles at a cost of $3,250. Evidently that means Fords. Maintenance cost, $4,500. I think all the data is here.

Mr. ZAPPONE. Yes; and the purpose for which they are to be used, traveling from farm to farm in connection with the tuberculosis of cattle, etc.

Mr. BUCHANAN. What is the highest price automobile you expect to purchase?

Dr. BALL. I do not think we have anything higher than a Ford or a Dodge. I know I turned down two or three requests for others.

Mr. BUCHANAN. Then that would be under $1,000?

Dr. BALL. Oh, yes.

Mr. ZAPPONE. We have about 84 machines at the present time, and about 81 are Ford cars. One of the other cars was purchased second hand. The Ford is the car that is principally used.

Dr. BALL. In our work we have got to go into the by-ways as well as on the main road. The Ford is the only car that we can get there with. The heavy cars would be of no use for us. They would be stuck two-thirds of the time in these muddy roads.

Mr. CHAIRMAN. I have had quite a little experience in this field work and I know what this provision means. I handled the barberry eradication in two States, and took charge of it for the Government and for the States. We had to pay $80 a month rent on Ford cars. That is the cheapest we could rent them. Now, we could purchase those cars and operate them for considerably less than that and save money on our appropriation, but that was the cheapest rent figure we could get anywhere.

Mr. ANDERSON. You evidently figure on the basis of maintenance of about $450 a year?

Mr. ZAPPONE. Yes; $450 a year for new machines.

Dr. BALL. In the case that I mention, that was only for the rent of the car, and then we had to pay for the operation of it besides. We paid that for rent only.

Mr. ANDERSON. You paid for the gasoline and oil, I suppose?

Dr. BALL. Yes, sir. If we broke anything we had to repair it.

Mr. ZAPPONE. We find that after a few years it is cheaper to buy new cars to replace the old ones than it is to attempt to repair the old cars. Then again the maintenance of old cars is quite a factor.

Mr. LEE. And you get something on the exchange?

Mr. ZAPPONE. Yes, sir.

Dr. BALL. We have got to the point where it means abandonment and renting, or else buying new ones. There is no question but what it is cheaper to have a man handle his car and be responsible for it than it is to undertake to hire cars.

Mr. BUCHANAN. Can you look at this and tell how many cars are itemized here; new cars that you expect to purchase?

Dr. BALL. Divide the amount of money by the price of a Ford and you can come very close to it.

Mr. BUCHANAN. I think you ought to figure out how many you need.

Mr. ANDERSON. It is all here, but it isn't added up; 48 new cars. That includes speeders and everything else. New vehicles of all kinds.

Dr. BALL. There is no question but that is economical, and it would save us money, to allow the purchase of these cars, as compared to what it cost us to run them. Of course, if you rent them by the day it runs away up into money; but renting them by the month, that was the cheapest price that I could get.

Mr. ZAPPONE. We could furnish a statement showing the number to be purchased, and the average price, and the bureau for which intended, if that would be of any assistance to the committee.

Mr. ANDERSON. I do not think that would add anything to the statement that is here. It would simply be summarizing what is already here.

Mr. ZAPPONE. Yes, sir. It is here in detail, but the totals are not shown.

Mr. ANDERSON. There are no cars in this whole list here costing over a thousand dollars?

Mr. ZAPPONE. I should say not over $500. They are limited to that.

ERADICATION OF FOOT-AND-MOUTH AND OTHER CONTAGIOUS DISEASES OF ANIMALS.

Mr. **Anderson.** Mr. Zappone, please insert a statement showing the original appropriation and the balance available of the original appropriation each year, together with the expenditures; also obtain a statement from Dr. Mohler, Chief of the Bureau of Animal Industry, showing how these funds were used.

(Following are the statements requested:)

Fiscal year.	Original appropriation and reappropriation.	Expended.	Balance.
1916	$2,500,000.00	$1,853,767.33	$646,232.67
1917	646,232.67	41,448.46	604,784.21
1918	604,784.21	45,567.08	559,217.13
1919	559,217.13	45,131.23	514,085.90
1920	514,085.90	55,944.47	458,141.43
1921	458,141.43	61,682.18	396,459.25

STATEMENT OF DR. J. R. MOHLER, CHIEF OF THE BUREAU OF ANIMAL INDUSTRY.

USE OF FUNDS FOR FOOT-AND-MOUTH DISEASE.

Dr. **Mohler.** From July 1, 1921 to January 31, 1922, a period of seven months—that is, the first seven months of the current fiscal year—there was expended from the appropriation available for the eradication of foot-and-mouth and other contagious diseases of animals the sum of $41,432.26. This money came from the unexpended balance of the original appropriation of $2,500,000 made in 1915 and which has been continued from year to year in balances varying in amounts. At the beginning of this fiscal year, there was a balance of $396,459.25 in this fund. After the expenditure for the first seven months of the fiscal year as above, there was on February 1, 1922, a balance of $355,026.99. It is estimated that the expenditures for the entire fiscal year 1922 will be about $71,026.

These expenditures from this fund represent the expenses of experts who are sent out to investigate reported outbreaks of foot-and-mouth disease. Numerous such reports reach the department from all parts of the country and it is imperative that all such reports be instantly and thoroughly investigated inasmuch as the delay of a single day in discovering the existence of this disease would cost the live-stock industry of the country millions of dollars. A further expenditure from this fund has been made for the maintenance of inspectors at the great stockyards of the country where all animals are carefully examined to make sure that they have no symptoms of foot-and-mouth disease. This is regarded as highly important. The history of previous outbreaks shows that the spread of this disease is through these yards where animals are brought for exchange and sale and are distributed to various States. In the view of the department, these measures are necessary and the department would be derelict if it failed to maintain the most rigid supervision of live-stock shipments in this manner. A third item of expenditure from the fund is the occasional payment of old claims resulting from previous outbreaks—such claims as may come from the Court of Claims or otherwise and have been for several years in controversy and process of adjustment.

FRIDAY, FEBRUARY 17, 1922.

STATEMENTS OF DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK, DEPARTMENT OF AGRICULTURE; HON. FRANK CLARK, MEMBER OF CONGRESS FROM THE STATE OF FLORIDA; AND DR. W. E. HINDS, ENTOMOLOGIST, ALABAMA POLYTECHNIC INSTITUTE, AUBURN, ALA.

CONTROL AND PREVENTION OF SPREAD OF MEXICAN BEAN BEETLE.

Mr. MAGEE. Page 267, control of spread and prevention of the Mexican bean beetle.

As I understand, there has never been any appropriation for this; is that right, Dr. Ball?

Dr. BALL. There was $100,000 appropriated emergency last year, with the hope of controlling this thing, holding it into a definite area by quarantine.

Mr. MAGEE. Was that the first appropriation?

Dr. BALL. Yes, and that was abandoned.

Mr. MAGEE. What was abandoned?

Dr. BALL. The hope of holding it into the area by the quarantine.

Mr. MAGEE. Was that a deficiency appropriation?

Dr. BALL. Yes.

Mr. MAGEE. Now you have an estimate this year of $25,000.

Dr. BALL. Yes.

Mr. MAGEE. That is the situation?

Dr. BALL. Yes.

Mr. MAGEE. Now, Mr. Clark is here and wishes to address the committee.

Mr. CLARK. Mr. Chairman, I know very little about this Mexican bean beetle, I am free to say to the committee, except I know in a general way the ravages of this pest. I have here a telegram from Mr. Wilmon Newell, who is plant commissioner and director of the Florida Agricultural Station. Mr. Newell knows more about things of that sort, I expect, than any man in Florida, and his statements are worth credence anywhere. There is no question about that, and I simply want to read this telegram into the record and say to the committee that I indorse every word of it, and am absolutely sure it is needed or else Mr. Newell would not advocate it [reading]:

GAINESVILLE, FLA., *February 15.*

Hon. FRANK CLARK,
Member of Congress, Washington, D. C.

Informed Congressional hearing certain agricultural appropriations will be held Friday. Florida especially interested securing adequate appropriations prosecution work investigations Mexican bean beetle and sweet potato weevil. Believe $50,000 should be available for Mexican bean beetle and $110,000 for investigations of insects affecting truck crops; this would increase amount available for sweet potato work by $20,000. Mexican bean beetle extremely serious pest bean and forage crops of South;

was introduced Alabama several years ago; has spread adjoining States; nearest infestation to Florida, Thomasville, Ga.; Florida's immense winter and spring bean crop threatened. Fourteen Florida counties now under quarantine account sweet potato weevil; every effort being made prevent spread, while large scale eradication demonstrations in Baker County and elsewhere are being carried on by Federal and State organizations successfully. Important this work be continued and not handicapped through inadequate appropriation. Urgently request you interest self in matter and inform other Members Florida delegation of situation with request they appear with you before committee to secure appropriation in sums mentioned. Congressman Anderson conducting committee hearing.

WILMON NEWELL.
Plant Commissioner and Director Florida Agricultural Experiment Station.

Now, that explains the situation just as fully as I could do it, or even more fully than I could do it if I stayed here all day and talked about it. I ask that that telegram go into the record and, as I stated, I absolutely indorse every word of it, and I have no doubt these gentlemen can give you very much more extensive information than Mr. Newell has in this telegram.

Mr. MAGEE. It seems that the Secretary has recommended $25,000 for the control and prevention of the spread of the Mexican bean beetle. I do not suppose that we will go beyond the amount recommended.

Mr. CLARK. No, sir; unless the facts showed that more was needed. When the Secretary made that recommendation there might not have been the necessity for more, but there may have been some changes since that time.

Mr. MAGEE. I doubt whether the committee would act unless the Seecretary made a supplementary estimate. I do not think there is any disposition to go beyond the amounts recommended by the Secretary.

Mr. CLARK. Well, it is a very serious proposition.

Mr. MAGEE. Now, with reference to the sweet potato weevil; Dr. Ball, is there any proposed appropriation?

Dr. BALL. Yes.

Mr. MAGEE. What page is that?

Dr. BALL. That is covered in the general truck crop appropriation of $90,000. I do not know that any specific sum is allotted.

Mr. CLARK. Mr. Newell wants $110,000, and he says that would give $20,000 more for the sweet potato. I want to say this about the sweet-potato proposition. I can not go into it, but the sweet potato is a very much more valuable product than people thought it was a few years ago. There are any number of by-products that can be manufactured from the sweet potato, and I think it is the greatest food product in the country to-day. I hope you gentlemen will give us enough to take care of it.

Dr. BALL. We are planning to eradicate that area that Mr. Newell is operating in.

Mr. CLARK. He is operating particularly in Baker County, which is in my district.

Dr. BALL. We are planning to eradicate that. He says there are 14 counties under quarantine.

Mr. GRAF. Those are the coast counties from Tampa around on the southwest coast. The northern section has one little outbreak right on the border of Baker County, and this area is the only one we can work under the appropriation that we now have.

Mr. CLARK. Well, I am very much obliged to you gentlemen.

Dr. **Hinds**. I do not know just what might be of interest and of help to the committee in consideration of the Mexican bean beetle matter. I may say in the beginning that I am State entomologist in the State of Alabama, and a number of years ago I was on the Bureau of Entomology staff in the boll-weevil investigations in Texas. I have been in Alabama since 1907.

We have had the Mexican bean beetle there, we believe, beginning in 1918, certainly not before that time, as far as we have any reason to conclude. Its existence there was not known to us until the 1st of July, 1920; that is a year and a half ago. At that time it occurred in only two restricted localities, very small parts of two counties just southwest of Birmingham, in the mining district, where they had brought a large amount of alfalfa hay by carload shipments from the western territory of Colorado and New Mexico.

As far as we have reason to belive, the insect was brought there in a commercial way, in those carload shipments—"hoboed," if you please—from Colorado to Alabama, in the spring or early summer of 1918, and became established right in the home gardens around these mining camps.

I have been asked to come to present the view of persons outside of the Bureau of Entomology in regard to this problem as representing the State where it started in the East.

We look upon it as an emergency proposition and not a continuing one. The appropriation a year ago was for preventing the spread and involving, as a part of the work, quarantine measures. By July of last summer it became evident that we were dealing with a species that was not capable of restriction by any quarantine measures, so from that time on, with the assurance of certain spread and the futility of quarantine work, extra effort was put on the control measures with the certainty that a large area was going to become infested in a short time, and it seemed increasingly important that real measures of control should be determined just as soon as possible.

I thought you might be interested in this map showing the production of dry beans through the United States. This does not include the snap bean; simply the dry beans, and does not include the soy beans. The percentages or relation, of the dry beans to the total of cultivated crops is shown by the different colors on this map. The old western area infested by the bean beetle shown within the purple line on the map, and from this territory the species spread to southern Alabama in 1918, in the extreme southern part of this area [showing]. In 1920 the beetle had spread in Alabama to the limits of this outer purple line, and isolated infestations probably occurred also at one point in southern Georgia—Thomasville—and one in northwest Georgia and at one point near Chattanooga in Tennessee. One year later, the end of 1921, it was known to have spread to these limits [indicating], covering a spread in two years ranging about 350 to 375 miles.

Mr. **Anderson**. In 1918 it was wholly confined to Alabama?

Dr. **Hinds**. Wholly confined to Alabama; in fact, only known in one locality.

Mr. **Anderson**. And now it covers a part of Alabama and a part of Georgia?

Dr. **Hinds**. Half of Alabama, one-third of Georgia, one-half of Tennessee, and is spreading into three other States, with the prospect that it will spread into Florida and Mississippi and will probably reach into Indiana, Ohio, West Virginia, and Virginia this coming year, 1922.

You may be interested in the direction of the spread. You will notice it is from the Southwest in a northeasterly direction, and you will wonder why. It is the prevailing direction of our light summer breezes, not the heavy winds, but the breezes, in which the insect takes wing, and the drift seems to be far more rapid in that direction than it does against the direction of the breeze. This direction is significant, because it is heading towards the main centers of bean production in the eastern United States, and at the rate it has spread in the last two years you can see that in two years more the prospect is that it may touch Michigan and in three years New York State. We do not guarantee that. We simply say that on the basis of the spread of the past two seasons it looks as though it might be in Michigan and New York by about 1924 or 1925.

Of course the matter of bean protection is a tremendously important one. The table bean crop, including snapbeans and dry beans, could hardly be valued at less than $100,000,000 a year; so the damage to that crop seems to be a very important matter, judging by our experience in North Alabama.

Where the insect occurred in the fall of 1920, in the season of 1921 they literally cleaned up the beans; 80 per cent damage to the table beans in that section would be a conservative estimate, 80 per cent damage, and only a part of the earliest crop of beans produced. No late beans. Take the lima bean crop, for instance, that of course is a crop grown in practically every home garden, and a great deal by truckers through that section. In the fall of 1920 there were lima beans in every home garden through that section. In the fall of 1921 all the green lima beans grown in a county of more than 1,500 square miles would not have covered 1 acre of ground. That shows the reduction. It means that the production of table beans, including snap beans, is liable to be practically eliminated where this insect becomes established.

Now, as to the conditions in which it may maintain itself: In the western infested area [here represented] the species has spread clear up into the northern part of Colorado and there we have high altitudes and semiarid climate, with a latitude that is practically on a line with Philadelphia, Pa. This is much farther north than it has yet reached in the East, and we have no reason to doubt that the insect is capable of spreading clear to New Hampshire or Maine on the Northeast here, and certainly I see no reason why it will not infest the whole territory east of the Mississippi River or even on the western coast if it should once get started there.

Now, these red lines represent the minimum winter temperatures, and if you watch those a little bit, here is the average winter minimum of 20 degrees below zero, this first blue line [showing], running down well to the southern edge of Colorado, and extending across into Wisconsin and back into Canada. The insect in this western habitat has maintained itself where the temperatures have gone below 30 below zero, and I have no reason to question that with the much more favorable hibernation conditions that prevail, particularly throughout the East, where we have a timbered and hilly country, much more timber shelter than occurs in some of that area in the West, it is more favorable for the insects, and I see no reason to question that the bean beetle will maintain itself in all of this territory [showing].

So far as being a general pest occurring year after year, it seems to me probable that it will be pretty regular. It has been very successful in hibernating under so low an altitude as 500 feet in Alabama during the past two seasons. These winters have been excessively mild, it is true, but the insect has been active in Alabama through every single month in the winters of 1920–21 and 1921–22. In January of this year the beetles were crawling in our hibernation cages.

Under western conditions there are two generations a year, coming out from hibernation late in the season, and I presume the cold nights have something to do with it. The reproduction begins somewhere around the middle of June; two generations running to about the middle of September.

With us in Alabama this last spring we had a complete generation developed before the time of the emergence in the western habitat, but instead of two generations we had the third completed and a part of the fourth, and the extreme range is from two to five generations in Alabama. The number of generations, of course, will decrease as the species gets farther north, but the fact is that with us in Alabama these table beans are destroyed within four or five weeks after they are planted.

Of course, the importance of other food plants must be considered. The insect attacks cowpeas and soy beans, being new food plants as compared with what were attacked in the western habitat, and the prospect is that the damage to these food plants will increase.

Now, the estimate of the value of the food plants of a hundred million dollars does not include the cowpeas or the soy beans at all. This little map shows where the green bean or the "snap bean" are produced. Florida is a heavy producer. Tennessee and Kentucky are heavy producers and Maryland and New Jersey the heaviest producers of snap beans. That of course extends clear up into New York, also a very heavy bean-growing State. Others are only a little less important.

As to dry-bean production, which includes the navies and the limas particularly, Michigan of course is the most heavily concerned in the East and California in the West. There is no reason why this insect may not go through the whole western territory if it gets started there. It has not happened to get started. California has a very effective quarantine system. I do not know what other factors may have been concerned in restriction of this spread, but simply as far as we know it never has gotten started in California.

Regarding cowpeas and soy beans, the productions are shown on these maps. The bean beetle is getting in where those crops are extremely important. We grow cowpeas and soy beans for forage as well as for renewal of soil fertility especially.

Mr. MAGEE. You do not contend that you can eliminate it?

Dr. HINDS. No, sir.

Mr. MAGEE. What can you do?

Dr. HINDS. Work out measures of control as effectively as possible.

Mr. MAGEE. You mean to keep it within the present limits?

Dr. HINDS. No. That is impossible. We should discover any possible measures of natural control, as by parasites or other natural enemies. If there is anything valuable of this kind it is probably to be found in Mexico, and it would take a competent entomologist to go into Mexico to study the development of the species under Mexican conditions and the appearance possibly of any natural enemies there, too. It is one of the ladybirds, and we know that as a group the ladybirds have very few parasites and very few predacious enemies; so that we have no reason to believe that we will ever get anything like full control from that source. We are going to have to depend principally on the development of measures of artificial control; insecticides probably, and it may possibly be by repellants. Sometimes an insect is kept away from a favorite food plant by putting on some substances that repels it.

Mr. Magee. Supposing it gets into a crop, ordinarily what percentage of the crop will be destroyed?

Dr. Hinds. With our table beans, including all of the kidney beans and practically all species of lima beans, it would run about 80 per cent destroyed, which means practically annihilation of the crop. The truck farmers around Birmingham have practically given up the effort to produce truck beans, and as a result of that the price of snap beans in the Birmingham market this year ranged above $3 a bushel right through the season, where the price in Montgomery, just outside of the infested area, ranged from one-half to two-thirds of that. It means of course as the area of infestation increases, that wide margin in price is going to increase. A comparatively small area infested this year produced a difference in price of $1 to $2 per bushel in the sale of these market beans. Now, where there is no local supply, as there was particularly around Birmingham, the price to the consumer goes up.

The canning industry for shell beans and for snap beans is threatened as far as I see it with extermination. I do not believe that anybody can continue to produce a 20 per cent crop of snap beans or shell beans. Certainly if they do, and you pay the cost of production, the cost of the product is going out of sight.

I would base the plea that is made for the supplemental estimate primarily on the value of these products and the necessity of determining effective control measures just as soon as may be possible, on account of the certainty of spread and the rapidity of spread of the Mexican bean beetle.

Mr. Anderson. Is the matter of speed in arriving at control measures wholly a matter of the amount of money you spend on the job?

Dr. Hinds. In part it is. I am sure you would appreciate this fact—that climatic conditions affect the growth of foilage and plants, and affect the action of insecticides. We are dealing with a plant that is extremely tender. Our poisons have not proven satisfactory or safe. It may be the purpose to develop few insecticides. It may be a process of combining those with what we already know and applying them in a way and at a strength that will be safe, but we have got to know a good deal more about the effect of these things under different climatic conditions. The work thus far has been conducted right in this territory in the heart of Alabama. The altitude there is considerably higher, and the summer rainfall several inches less than it is down here at Thomasville, Ga. That is the most southern infested point in the East and the altitude is only 100 feet. This is the lowest altitude yet reached by this species in the United States.

I believe the reactions of the insect to these conditions and of the plant to insecticides ought to be studied under just as wide range of geographical and climatic conditions as we can find in the East. I believe we ought to have a pretty thorough study made also out in New Mexico where it is dry and high. Now, if we can cover the range of conditions in that way, it will be possible for us to warn other sections in advance as to the readjustment that will have to be made in other regions on account of this insect.

If I might cite a somewhat parallel case, the Mexican cotton boll weevil also came from Mexico. We had no idea when it first came into Texas—I went into Texas on that work in 1902—and we had no idea then that the boll weevil was going to go all over Texas. It was considered as a subtropical thing that would probably be confined to a comparatively narrow belt in south Texas, along the Gulf coast. We found after awhile that we were dealing with an insect with a wonderfully adaptive capacity.

Mr. Buchanan. Do you know what spread it?

Dr. Hinds. Fairly well.

Mr. Buchanan. Do you know what caused it to spread particularly?

Dr. Hinds. By flight.

Mr. Buchanan. No; it was not flight, it was a storm.

Dr. Hinds. Well, that is flight.

Mr. Buchanan. You can call that flight if you want to, but if a storm picks up something and carries it on, whether it will or whether it will not, I don't know whether that is flight. That storm of 1898 carried this boll weevil hundreds of miles. That was called the Galveston storm.

Dr. Hinds. Yes; that was in 1900. There were other storms that helped in that dissemination, but the great spread clear eastward across the cotton belt occurred by flights that averaged 50 or 75 miles a year.

Now, this thing has shown capacity of more than twice the rate of advance shown by the boll weevil. It has thus far shown adaptive capacity to climatic conditions greater in range than yet encountered by the boll weevil. It has shown greater adaptive capacity as far as food supply is concerned than has been shown by the boll weevil. While the boll weevil is absolutely confined to the cotton belt, here is something that is apparently going to spread all over the eastern United States, and as far as the ultimate seriousness of the problem is concerned, it seems to me it is going to be more serious for the whole agricultural system of the United States than the boll weevil is.

As far as seriousness to a cotton-growing State is concerned, I put the boll weevil first, because the cotton crop in Alabama has more value than the bean crop, but as far as the whole agricultural system of the territory that is liable to be infested is concerned, it seems to me it is one of the most serious things we have had to face.

Mr. Buchanan. Does it attack anything but beans?

Dr. Hinds. All of the table beans; the lima beans; the cowpeas and soy beans and several other less important food plants. We have had some breeding in a field of alfalfa. We do not know how far it may go. There is some reason to believe that as the insect develops on one of its food plants and its offspring feed on that plant, and their offspring feed on that plant, that after a few generations perhaps we may have a strain of the thing with a taste for that particular food plant.

Mr. **Buchanan**. Does it reproduce within the bean?

Dr. **Hinds**. No. It is all on the outside. It is exposed. It is on the under surface of the leaf. If you are interested in specimens of the work, I have several photographs here.

Mr. **Buchanan**. You ought to be able to poison them, in that case.

Dr. **Hinds**. It looks so, but the fact is that the bean itself is very susceptible to injury. The insect feeds on the under surface of the leaf. It cleans off that surface, and it is not very easily reached by poisons. We have not yet found satisfactory poison methods. The most promising thing for snap beans, for instance, would be an insect powder like this fly powder, and the cost of that is so high that it could not be depended upon for any large scale work. But that is the only thing thus far that we will be at all safe in recommending for snap beans.

Mr. **Wason**. Then you have got to get at it on the underside of the leaf?

Dr. **Hinds**. The most effective way, of course, if a contact insecticide is used. I do not want to take up your time, but I thought you might possibly like to get a little familiar with the insect and its work. I have quite a set of figures here that will show something on that. I don't know whether any of you have ever seen it at work in the field, but I know it is impossible to really form a conception of it until you have seen it in the field. I know even entomologists were deeply impressed when they went into the infested area.

Mr. **Magee**. It looks to me like sort of a hopeless proposition.

Dr. **Hinds**. Well, we are not ready to give it up.

Mr. **Magee**. I understand that.

Dr. **Hinds**. The harder the problem I think the harder we ought to push it. That is my feeling, frankly, in regard to it; that we can not afford to reduce the work that is being done at the present time.

Mr. **Magee**. It don't seem to give much encouragement or gain any effective control over it.

Dr. **Hinds**. Of course, you realize this, that it takes one year's work at least to show you any promise in the lines of effort, and we have just had that. Now, with a fairly well trained staff, with the most promising lines indicated, it looks to me as though we ought to expect most satisfactory work in the next two years.

Another thing with an insect subject to variation, as undoubtedly this is adaptive, the results of only one year's work can not be conclusive.

Mr. **Magee**. Does it take all varieties of beans?

Dr. **Hinds**. It takes practically all of the kidney and lima beans.

Mr. **Magee**. How about marrows?

Dr. **Hinds**. It takes all of those; the kidney bean—an important item of food supply, very important as far as New York and Michigan points are concerned, and is a particularly favored food plant.

Mr. **Lee**. Have you stated whether it affects the soy bean or not?

Dr. **Hinds**. It does; not as seriously as it does the table beans, but I have seen fields of soy beans that were literally skinned by them. I have seen a field of cow peas of very heavy growth where the weight of the hay was reduced at least one-third by the work of these insects, and, of course, the feeding value of the hay was reduced more than one-third.

Mr. LEE. When does it begin to attack the bean?

Dr. HINDS. They were waiting for the beans to come out of the ground the middle of March last spring. We found the first eggs on bean plants in the field about the 21st or the 22d of March, and from that time on until the beans were destroyed by frost, their breeding was continuous.

Mr. WASON. Suppose you did not raise any beans for a season, how would that affect it?

Dr. HINDS. The variety of food plants is so great that we would probably miss the control result there. That of course has been proposed for the boll weevil, but I have never seen that it was practical even with the boll weevil, which is absolutely confined to cotton.

Now, here is something that may live or may breed on six or eight plants, and the elimination of any one would not make much difference. The trouble would be resumed just as soon as you planted your favorite plants again.

Mr. BUCHANAN. It looks to me like you ought to poison anything that feeds on a leaf.

Dr. HINDS. It does look so, and, of course, that was the first line of attack, but the fact has been shown that the arsenicals are quite largely repellant to these bean beetles and you are trying to kill something with something that drives it away from it, and they do not like the taste of it.

Mr. BUCHANAN. You mean they leave the plant?

Dr. HINDS. The adults leave the plant and move elsewhere. Of course, there are always some leaves on the plant that are not poisoned.

Mr. BUCHANAN. They appear to be able to detect a leaf-carrying poison from one not carrying any.

Dr. HINDS. They seem to.

Mr. BUCHANAN. You have got to disguise that poison.

Dr. HINDS. It is a problem to be worked out.

Mr. MAGEE. What is this beetle; that is, when it is so destructive. Is it developed into a fly?

Dr. HINDS. No. The most destructive stage is the grub stage. That is shown by these figures right here [showing]. The major part of the damage is done by these nearly grown grubs.

Mr. LEE. This is how many times magnified?

Dr. HINDS. Four diameters. You might be interested in this that the number of grubs really matured, three or four on a plant, will completely destroy a plant like the ordinary snap bean plants. Three or four grubs coming to maturity will do damage enough to destroy that plant.

Now, we have had records of several that have deposited up to 1,600 eggs to the female. Now, that is rapid reproduction.

Mr. WASON. I understood you to say that the maximum times that she can lay eggs is five times a year.

Dr. HINDS. No. They deposit eggs in clusters. Those eggs are in a group.

Mr. WASON. More than one cluster a year?

Dr. HINDS. Oh, yes; a good many clusters. Maybe, 15 or 20 or more.

Mr. BUCHANAN. To one female?

Dr. HINDS. Yes. The eggs are laid in clusters like that, and some of the beetles that we carried through the winter continued to deposit eggs through the following July; so that the egg-laying period extends over quite a number of weeks. They will lay two or three of those clusters a week. They will lay one day and then feed for a day or two and then lay for another day.

Mr. BUCHANAN. This is an actual photograph of the eggs?

Dr. HINDS. That is magnified, of course, about four diameters also.

Mr. WASON. I understood you to say that you had records of four groups.

Dr. HINDS. Four complete generations—that is, three complete generations and a partial fourth generation.

Mr. MAGEE. In one season?

Dr. HINDS. In one season. We might be able to cover a season with two generations, or even less, if we took the last-laid eggs. The first-laid eggs of each generation would give us five. I am speaking of the average generations when I say we have three full generations and a partial fourth generation.

Mr. WASON. As I understood you, you mean that the eggs then are laid some time at the beginning of the year and then they hatch and that group becomes grown to maturity and lays eggs again, and you can get three matured groups because three sets of eggs are hatched, which you call a generation.

Dr. HINDS. Yes, sir. The generation that we would figure is from the average egg laying of a number of specimens. That is, if we are taking an average of a hundred families, it would take a certain length of time for them to deposit half of their eggs. Taking the crest of the wave for each of these succeeding generations, we would have three and part of the fourth in Alabama. In the western area the multiplication is very much less. That is why we believe it is more serious here than it is in the western area.

Mr. MAGEE. What is the ordinary life of the beetle?

Dr. HINDS. We had specimens that were taken in the fall of 1920 and carried through in the hibernation cages and died the following August, 1921. In that case they lived over nine months. I found a boll weevil that lived to be a little over a year old. Probably in the course of time we might get a Mrs. Methusalem Bean Beetle a year old.

Mr. LEE. Do you know if the birds and fowls feed on these?

Dr. HINDS. They do not. The birds are repelled, probably by the odor or by an oil that is excreted by the bugs. A rather familiar fact with practically all of the lady birds, they are distasteful to birds. These beetles have oil glands right at the knees and if the plant is disturbed they close their legs quickly and force out a little drop of this oil. That gives them a little circle of six of those drops of oil right around their body. I have known of one case where poultry, under the influence of shortage of grain feed, were taught to go around and pick them up when they were jarred off of the bean and were running around the yard; but that was just one isolated case where they learned to do that. So that I do not think we can depend upon poultry to any extent, or wild birds, for we have no record of any feeding. Predacious enemies are largely repelled, apparently. There are some general predacious insects that feed upon the grubs, but they are very few.

This photograph may interest you. It shows you how they collect on the leaves of a plant that is not a food plant. Such plants often give them best protection during the transformation from the grub to the matured stage. They simply group on some of these weeds that are around the food plant..

Mr. **Wason**. They can breed on most any of this wild vegetation?

Dr. **Hinds**. No. When we speak of breeding, we speak of feeding and raising the young. They do not do that except on these main plants that I have spoken of, except in a very limited degree. There are some legumes which are grown in the South, which are used to some extent as forage plants. The Kudzu is such a host plant. Now, corn is not a host plant, but when it comes to exhaustion of their natural food supply they may feed on other plants. We have what we call cornfield beans, shell beans, which are raised in the cornfields of the South very commonly. They just simply twine around the cornstalks. That prevents the necessity of staking them, that holds them up. When the bean foliage has been exhausted late in the season, we have had considerable beetle feeding on the corn. Okra and squash and various other plants have been attacked to considerable degree, but we do not call them host plants.

Mr. **Wason**. Do I understand you that these females will lay their eggs on anything outside of this bean?

Dr. **Hinds**. They may lay their eggs under force of necessity even on glass or cloth or wood, but if their food supply is present, they will lay them preferably on the food supply.

Mr. **Wason**. Suppose they laid them on a glass and the eggs hatched, what becomes of them?

Dr. **Hinds**. If there is a food supply close by, they may find it. If it is not very close by they would probably perish.

Mr. **Magee**. Do they move by flying entirely?

Dr. **Hinds**. The young grubs move entirely by crawling. I have here a photograph which will show the feeding. The first stage of the grub developes right on the leaf where the eggs were laid, and begin eating about the second day after the hatch.

Mr. **Lee**. Does this bug attack what we commonly know in the South as cowpeas?

Dr. **Hinds**. It does. I have known of a case where the damage was as high as 30 per cent of the weight. Our cowpea production is a very important matter down in our section.

Mr. **Lee**. Yes; it is very important with us in Georgia.

Dr. **Hinds**. Yes. Here is a picture showing South Carolina as the heaviest producer of cowpeas of all that section. Each dot represents a thousand acres of cowpeas. I do not know how far it is going on cowpeas. I do not believe that the damage is going to be 75 or 80 per cent as it is with the garden bean, but I do feel this, that as the insect feeds longer and more generations are produced on cowpeas, the probability is that the danger will increase.

Mr. **Lee**. What is that green spot shown on the map there in Alabama?

Dr. **Hinds**. That is where the pest started. That is the 1920 infested area. This red line is the 1921 infested area.

Mr. **Lee**. It will put us out of business if it gets in its work there. Last year I raised a thousand bushels of soy beans. Suppose it had hit me.

Dr. **Hinds**. I would not come here and make a statement that the production of cowpeas or soy beans is going to be eliminated. As far as I can judge, the production of shell beans and dry beans and snap beans, including lima beans, will be made impossible wherever this beetle becomes established.

Mr. **Buchanan**. You do not hold out any hope for us. You do not even state that you can find a remedy.

Dr. **Hinds**. I believe that it will be possible, but it is not an easy problem. You take the dry beans, the snap beans—those two crops together—and it is somewhere around a hundred million dollars.

Mr. **Buchanan**. We understand about the importance of the bean crop, and it runs through the economic life of the whole nation. We understand that. The only question now is, Can we do it? Can we stop it? Can we kill them? Can you find an effective remedy?

Dr. **Hinds**. We can not until we try.

Mr. **Buchanan**. Now, can you find a remedy that is within the reach of the average bean grower?

Dr. **Hinds**. That is exactly the problem that is to be worked out. It is the necessity for that which makes me feel that it is advisable to concentrate on this for the next two years.

Mr. **Magee**. The fact is, then, that the present situation is a groping one. You are trying to see if you can find something that may possibly be the end of this pest.

Dr. **Hinds**. In a measure that is true. We are of course hunting for some effective remedy which may do something. That effective remedy may be something new.

Mr. **Wason**. Do you know anything about the history of this beetle?

Dr. **Hinds**. It runs back probably beyond the beginning of history in Mexico. I have no doubt that the Aztec Indians had it to fight. The insect might have been a factor in their moving. We had the boll weevil and the Colorado potato beetle and now we have the Mexican bean beetle imported from that country.

I speak not only personally, but generally, for the entomologists of the cotton States. We had a meeting in Dallas, Tex., last November or the first part of December, where this whole problem was discussed and the sentiments of the southern entomologists is that this work should be carried through and fully maintained; followed after and extended to include the range of climatic conditions and the growth of food plants extending into Mexico, so as to get the different conditions where the insect has been longest, as far as we can judge; to find natural enemies if such exist, that we might introduce them to get the benefit of them if there is any such thing. We ought to go practically to the limits of these things this year and probably next year, and to do that I do not see personally how it would be possible to do that with less than $50,000, which would mean a supplementary estimate of $25,000.

Mr. **Wason**. This beetle first showed itself in Alabama, you say, in 1918, as far as you know.

Dr. **Hinds**. Yes, sir.

Mr. **Wason**. When did it first show itself north of the Rio Grande in this country, as far as you know?

Dr. **Hinds**. As soon as the beans began to be grown up in that territory, probably 50 years ago.

Mr. WASON. It has been living there since?

Dr. HINDS. Yes. It has been known for 40 or 50 years. Dr. Ball has been familiar with it out in that section.

Mr. WASON. Dr. Ball has been familiar with it for 50 years?

Dr. HINDS. No; I don't say that he is that old.

Mr. MAGEE. Where were they, north of the Rio Grande, 50 years ago?

Dr. HINDS. In New Mexico, Colorado, and the eastern part of Arizona.

Mr. MAGEE. What did they do there?

Dr. HINDS. In many cases the growers gave up the culture of beans.

Mr. WASON. Did that stop the spread of these things?

Dr. HINDS. As soon as they planted beans again they were back in short order.

Mr. WASON. In other words, it will exist in some form and come to life again and spread as soon as it gets something to feed on?

Dr. HINDS. The species maintains itself; yes, sir.

Mr. BUCHANAN. It finds something else to feed on.

Dr. HINDS. They do evidently find some other food plants.

Mr. BUCHANAN. If it can not get cake, it takes corn bread.

Dr. HINDS. That is true; if it can not get a full feed it gets a half feed.

Mr. WASON. He is a persistent little rascal.

Dr. HINDS. It evidently is that.

Dr. BALL. I wish you would have Dr. Hinds tell you what the Southern States are doing—his own State.

Mr. MAGEE. We will be glad to hear it.

Dr. HINDS. You are familiar with this, that Alabama is the only State that has the legislature meeting once in four years. Our next session is January, 1923. At a special session held in 1920 the insect had been known only two months in the State at that time, but we realized the seriousness of the prospect. We went before that special session of the legislature and asked them for $250,000 appropriation as Alabama's part toward an eradication campaign. I did not know enough about it at that time to know that that was impossible. We believed that it was possible and that with the chances of success it ought to be undertaken.

We came also to the Secretary of Agriculture about it, to see what might possibly be done to get Federal support for Alabama, if that went through. While I was here in Washington the bill came up before the senate in Alabama, and while we had a majority vote, we did not have the two-thirds that was necessary to adopt it, so that the Alabama effort failed. We have no special appropriation for fighting this insect. We have been concentrating our regular appropriations, which are small in Alabama especially, upon this problem, because we believed it was more important right at that time than the cotton industry, for instance. Now, we have been working on that for about a year and a half while suspending other problems that are still pressing for attention. But I must say this, that the boll weevil has helped to bring about good farming. It has been a big factor in bringing about diversification, and diversification has brought in a number of these crops.

I could show you from charts here, if we were to take the time, that Alabama has been increasing the production of these legume crops by more than 10 per cent a year for the last 10 years. We have increased over 6 per cent in the production of the legume crops in the last 10 years. Now, here is something that comes along and knocks that diversification in the head. It is going to make it more difficult to fight the weevil. It is going to be true, as far as I can judge, through all the cotton belt.

Mr. MAGEE. Do any of you gentlemen desire to ask the doctor any questions?

Dr. HINDS. We can appreciate this, gentlemen, absolutely, that there is a necessity for economy, and we would not be asking anything that we did not think was absolutely in harmony with that; but the State entomologists, in their recent meeting at Dallas, Tex., felt that a minimum of $50,000 was necessary to carry through the investigational work for the next year and possibly the year after, and by that time we would hope that we had gone far enough in finding methods of control so that the necessity for this increased appropriation will cease.

Mr. MAGEE. If there is nothing further, the committee will stand adjourned until 10 o'clock Monday morning.

WEDNESDAY, FEBRUARY 15, 1922.

STATEMENT OF MR. A. ZAPPONE, CHIEF DIVISION OF ACCOUNTS AND DISBURSEMENTS, DEPARTMENT OF AGRICULTURE.

MILEAGE RATES FOR MOTOR VEHICLES.

Mr. ANDERSON. Now, there is an item on page 268 which relates to the mileage rate which you allow employees for the use of motor cycles or automobiles.

Mr. ZAPPONE. Mr. Chairman, that is for the purpose of allowing to employees of the department compensation for the use of their personally owned machines in connection with their official work. This provision was put in several years ago, and the rates of 3 cents a mile for a motor cycle and 7 cents a mile for an automobile still prevail. We find this amount is hardly sufficient to meet the actual costs of operation, and employees have suffered personal loss by using their machines in Government work. It is desired to increase the mileage rates for motor cycles and automobiles to 4 and 10 cents, respectively, as being more nearly the actual cost for their operation.

Mr. ANDERSON. How much is spent under this appropriation?

Mr. ZAPPONE. I have never prepared a statement bearing on that, Mr. Chairman, and do not believe it has ever been worked out for the whole department. Not a very large amount, perhaps, but if we had to go outside and hire vehicles in each and every case it would cost the Government a great deal more money than is being used to reimburse employees for the use of their own machines. Oftentimes the place where a vehicle can be hired is far removed from the employee's station. Through the use of his own car the employee can get out any hour of the day or night. I could only guess at the amount expended.

Dr. **Ball.** It isn't very much.

Mr. **Anderson.** I think we would like an estimate of what is involved in this item.

Mr. **Zappone.** I will be glad to submit it.

NOTE.—It is estimated that expenditures by the department for the fiscal year 1921 in reimbursing employees for the use of personally owned vehicles in official work at mileage rates of 7 cents for automobiles and 3 cents for motor cycles was approximately $269,000.

Dr. **Ball.** It says there "not to exceed." That does not mean to say that we would need to pay that amount in all cases. If you are running on paved highways in your work, or on the city streets, 7 cents a mile might handle an automobile, but where you are sending them out into the mountainous country or into the country dirt roads in the rainy season, sending them into the sand sections and things like that would be a very different expense. That rate would vary according to the work demanded of the car. On the paved streets you might handle a car for 7 cents, but you can not do work such as we require in the tuberculosis eradication and work of that kind where you have to go regardless of the roads.

Mr. **Anderson.** It will not be very many occasions when you will get it for less than 7 cents.

Dr. **Ball.** It costs me $15 in 15 minutes to get hauled out of some mudholes on one of my trips. I had three cars going through in northern Wisconsin, and I paid $5 a car to get hauled out of each mudhole.

SHORT-TIME RURAL CREDITS COMMITTEE.

Mr. **Anderson.** Do you know about this next item which is to be eliminated, to enable the joint committee of the two Houses on short-time rural credits to be constituted?

Mr. **Zappone.** No, sir; I do not. The amount was not even warranted to the department. It went to the commission appointed by Congress.

Mr. **Anderson.** Is it a continual appropriation until the commission completes its work?

Mr. **Zappone.** Yes; I think so.

Mr. **Anderson.** Any way, they have not asked for an estimate; so I take it that they are not going to do anything.

Mr. **Lee.** Who is the chairman of this commission?

Mr. **Anderson.** The chairman is Mr. Haugen.

Mr. **Zappone.** I think that is without year and that they can use it until they complete their report.

Mr. **Anderson.** I think we should like to know what was done under the item on page 269 for the purpose of seed loans to drought-stricken areas. I think that item was not proposed to be continued for the next fiscal year.

Dr. **Ball.** We will submit a statement, or shall I telephone for somebody to come up here?

Mr. **Anderson.** I should like to hear somebody on that item.

STATEMENT OF MR. C. W. WARBURTON, AGRONOMIST, IN CHARGE OF SEED LOAN OFFICE, BUREAU OF PLANT INDUSTRY, DEPARTMENT OF AGRICULTURE.

PURCHASE OF SEED GRAIN FOR DROUGHT-STRICKEN AREAS.

Mr. ANDERSON. Mr. Warburton, we want you to tell us something about an item on page 269 which was carried last year, under which we provided an appropriation of $2,000,000 to make loans for seed and feed purposes in the drought-stricken sections of the country.

Mr. WARBURTON. There was not any of it feed, was there?

Mr. ANDERSON. I guess that is the proposal now. Last year it was seed alone.

Mr. WARBURTON. The bill, as you recall, was approved by the President on March 3. We got in the new administration on the 4th and a new Secretary on the 5th, which was Saturday. On Monday the Secretary appointed a committee to supervise the carrying out the provisions of the act, of which Mr. L. M. Estabrook, then chief of the Bureau of Crops Estimates, was made chairman.

At a meeting of that committee on March 7, I was designated to take charge of the field work, and it was decided to establish a field office at Fargo, N. Dak., that being considered as suitable a point to reach all sections of the drought-stricken territory as it was possible to obtain.

The forms were planned by the committee and approved by the Secretary, and on March 12 were delivered into the mails by the Government Printing Office. I left for Fargo on March 12, and with the cooperation of the local people there obtained office quarters and established a force and immediately on receipt of the various forms began mailing them out to county agents and other designated representatives in the counties in the drought-stricken territory, which was taken to be central and western North Dakota, most of Montana east of the Rocky Mountains, a few counties in Idaho, and about four counties in the State of Washington.

The first loan was completed on March 24, and during the remainder of March and April practically the entire amount of $2,000,000 was loaned. The total loans, as I recall, amounted to $1,950,000. The greater portion of the money was loaned in Montana, the total there being $1,044,000; in North Dakota, $806,000; in Idaho, $95,000; and in Washington, $10,000. The total number of loans made was about 14,000. I can give you the exact figures, I think; 13,935.

Mr. BUCHANAN. The total number of loans?

Mr. WARBURTON. The total number of loans was 13,935.

Mr. ANDERSON. That would make an average of about $130 per loan?

Mr. WARBURTON. About $130 per loan. The law provided that the loan should not be in excess of $200, and in order to place a limit on the small loans, that is, to provide that an individual who only wanted to sow 45 or 50 acres should not get a loan of $200, the law specifying that this was to be for the purchase of seed only, one of the Secretary's regulations was that the loan should not be in excess of $2 per acre. Later, during the progress of the work, the prices of grains declined, so that it was decided that about $1.50 an acre would buy the seed of any of the crops named in the bill—wheat, oats, barley, and flax. Most of the loans therefor were made on the basis of $1.60 per acre, as sufficient for the purchase of seed. As the chairman has stated, the average loan was around $130. About 18,000 applications were received, and about 4,000 of them were rejected for one reason or another, because the applicant did not have a crop failure the previous year or because his general reputation in the community was not good. We did not feel that with the large number of people needing funds this money should go to people who had a reputation of never paying their debts; people who were not good farmers; people who were not deserving. There were only a few such cases. In general, the applications were rejected, because the applicant could not qualify as having had a failure the previous year.

Mr. BUCHANAN. I notice in your statement you state that about $1,950,000 was loaned.

Mr. WARBURTON. Yes, sir.

Mr. BUCHANAN. Was the other $50,000 overhead expenses, or did it go back to the Treasury, or what became of it?

Mr. WARBURTON. The expense, as I recall, of making the loans last spring was around $15,000. The balance of the fund has been used—practically all of it, I think—in collecting loans during the fall and winter. Collections have been very much more difficult than the making of the loans.

Mr. BUCHANAN. About $15,000 was for administration, in making the loans?

Mr. WARBURTON. That figure would be about correct, I think. I do not have the exact figures. Possibly if the charges for printing were figured in it would run more than that, but I think that the expenses of the field office were about $15,000. We tried to do the work as promptly as possible and therefore it was necessary to employ quite a large force. At one time we got up to 40 people in the field office.

Mr. BUCHANAN. Then the remaining $35,000 has been spent and is being used in collecting these loans?

Mr. WARBURTON. Yes. There is a small balance—as I recall, a balance of perhaps four or five thousand dollars at the present time—but something like $25,000 or $30,000 has been spent in collecting the loans during the fall and winter.

Mr. BUCHANAN. With what success?

Mr. WARBURTON. We have collected about $600,000 or $625,000.

Mr. ANDERSON. Is that about all you are going to get?

Mr. WARBURTON. That is about all we will get this year. In many cases the farmers who borrowed last spring again had crop failures in 1921, and, so far as we have been able, we have obtained mortgages on the 1922 crops as further security for the loans. There will be some collections on those mortgages, although I do not expect the collections to be very large after this year; that is, after the collections from the 1921 crop.

Mr. BUCHANAN. You will lose over half of it, then?

Mr. WARBURTON. I would estimate that at least half of the farmers to whom loans were made did not have a crop in 1921 sufficient to justify the collection. In the case of a man who only had three or four bushels of wheat to the acre, or less than that, we did not feel that we were justified in taking that wheat away from him. It would take two or three bushels of wheat per acre to pay his loan. Many of the farmers had durum wheat, which in Montana sold as low as 50 cents a bushel. It was in those cases that the extensions were granted on the decision of the Secretary, and a mortgage taken wherever it was possible to obtain one, on the 1922 crop.

Mr. LEE. Isn't it a fact that they have a crop failure there about three out of every four years?

Mr. WARBURTON. Recent experience has been rather worse than that, I think. In some sections of Montana in particular there has not been a paying crop since 1916.

Mr. LEE. Really that is a grazing country, isn't it? A sheep country?

Mr. WARBURTON. I think it is a far better grazing country than a wheat country, yes, sir.

Mr. BUCHANAN. These people from whom you did collect, do you know whether or not as a general rule they made anything, or otherwise, or came out in debt?

Mr. WARBURTON. You will have to remember that practically all of the people to whom loans were made have an accumulation of debts running back four or five years; that in general they have not had a paying crop since 1916.

Mr. BUCHANAN. Eliminating former debts, taking the debts for that year, last year, taking all the debts contracted and the obligations incurred for that year, together with the Government loan, these people from whom collections were made, did they clear anything on that year's operation?

Mr. WARBURTON. Some of them did. A large percentage of them undoubtedly did not. That is, they got very little pay for their labor. Threshing bills were extremely high. Most of these people are a long way from the terminal markets, so that the freight rates cut down their prices per bushel very decidedly. Many of them grew durum wheat, which, as I said a few moments ago, was selling in northeastern Montana as low as 50 cents a bushel, and after paying the Government loan and the threshing bills, there was very little left.

Mr. BUCHANAN. Have you made any figures of what per cent of them did not plant seed at all?

Mr. WARBURTON. I have heard of a very few cases, and in those cases wherever we have been able to do so we have made collections. I do not recall now more than four or five cases which were reported to us. Generally, when there is a case of that kind there is some neighbor who has a grudge and he is very glad to report.

Mr. LEE. Most of these farmers are of the tenant class, are they not? They do not own their lands, do they?

Mr. WARBURTON. Most of them are land owners. In Montana, in particular, they are comparatively recent homesteaders, practically all of whom have now proved up on their claims. In western North Dakota there are a considerable number of tenants.

Mr. LEE. Those lands belong to big syndicates, as I understand it?

Mr. WARBURTON. Not necessarily; no.

Mr. LEE. I thought that came out here a year or two years ago.

Mr. WARBURTON. Most of the real large farms in North Dakota are in the eastern part of the State where no loans were made. The so-called bonanza farms are in eastern North Dakota.

Mr. **Buchanan**. What per cent do you judge these people to whom you furnished this seed are land owners?

Mr. **Warburton**. I would say, certainly, 80 per cent of them, although I have no figures. I never made any tabulation of it.

Mr. **Anderson**. Have you the receipts of loans paid, by States or counties?

Mr. **Warburton**. I have a recent tabulation which was sent in from the field office, which is now being maintained at Grand Forks, N. Dak. This was a statement made on January 27, which shows the collections from Montana to be $305,000, North Dakota $231,000, Idaho $66,000, Washington $4,000.

Mr. **Wason**. Have you the figures of the amount loaned in each of those territories?

Mr. **Warburton**. Yes, sir. The loans in Montana were $1,045,000. Collections, $305,000.

Mr. **Anderson**. What proportion in number would that represent?

Mr. **Warburton**. These payments include partial payments. That is, there were some who were paying on a $200 loan $50, or $100. This total includes those partial payments. I think I have here the total number who have paid, but I do not have the number who have paid by States. The total number of loans paid is 4,124 out of 13,935. That is about 30 per cent. Then there are also some partial payments.

Mr. **Anderson**. You did not complete the statement, I think, that Mr. Wason wanted.

Mr. **Warburton**. In North Dakota $806,000 loaned with $231,000 paid in.

Idaho, $95,000 loaned with $66,000 paid in.

In Washington a little less than $10,000 loaned with a little over $4,000 paid in.

The largest percentage of collections is from the State of Idaho.

Mr. **Anderson**. The net result of this experiment seems to be that we helped some people a little and a lot of people not at all, and that the Government is going to be out about a million and a quarter or perhaps a little more.

Mr. **Warburton**. Yes.

Mr. **Anderson**. How many acres did these loans cover?

Mr. **Warburton**. I would say roughly somewhere from a million to a million and a quarter. The maximum loan was $2 per acre, and most of them were made on the basis of $1.60.

Mr. **Anderson**. Have you any idea what the average yield was on that acreage?

Mr. **Warburton**. It varied from nothing up to 30 bushesl to the acre. I could not make a guess as to the average.

Mr. **Anderson**. I presume a large per cent of it was nothing?

Mr. **Warburton**. We estimated last fall, when be began to make collections, from the best reports we could get from the various counties, and judging from the number of loans made in those counties, that probably at least half of the borrowers had crops which would average less than 5 bushels per acre; and a comparatively small part, perhaps 15 or 20 per cent, had what might be called really good crops, 15 or 20 bushels to the acre.

Mr. **Anderson**. What was the threshing fee out there, 15 or 20 cents a bushel?

Mr. **Warburton**. It depended entirely on the job. If it was a good crop, it would be as low as 15 or 20 cents. There were many cases reported to us where the thrashing charges ran up as high as 50 cents per bushel. That would be on a poor crop where a considerable quantity of straw had to be worked over, and the charge was on the basis of a fixed price for setting and a fixed price per hour, which, of course, would make the bushel charge run very high.

Mr. **Buchanan**. It is a question as to whether they made as much as $2,000,000 out of the loans, is it not?

Mr. **Warburton**. Oh, yes; it was more than that, I would say. In one county—Valley County, Mont.—in which about 1,000 loans were made for a total of $166,000, which probably means around 100,000 acres of grain——

Mr. **Buchanan**. Do you mean by that seed loans, or other farmers that already had the seed?

Mr. **Warburton**. Seed loans.

Mr. **Buchanan**. That was realized from these seed loans?

Mr. **Warburton**. There were over 1,000 loans in the county, a total of, I would say, at least 100,000 acres of grain. It was reported by the county agent of that county that the average yield of wheat in the county would be around 20 bushels per acre, so that while there were some seed-loan borrowers who did not have any crop at all, because of hail damage, if the average was around 20 bushels per acre that would be 2,000,000 bushels in that county alone. Our collections in that county have been very good, although we have had the strongest kind of opposition.

Mr. **Buchanan**. What percentage of your collections did you make in that county?

Mr. **Warburton**. We collected 632 loans in full, and have received partial payment on 51, out of a total of something over 1,000.

Mr. **Magee**. What would the loans average?

Mr. **Warburton**. The loans averaged in that county about $150. The general average was around $135.

Mr. **Buchanan**. You collected about one-third?

Mr. **Warburton**. Of the total amount of loans?

Mr. **Buchanan**. In that county.

Mr. **Warburton**. No, in that county it was nearly two-thirds. It was 632 loans collected in full out of a little over 1,000.

Mr. **Anderson**. I am afraid it would not be regarded at the best as a very good investment.

Mr. **Warburton**. We are still hoping to collect some additional loans in that county. We have had considerable opposition from certain bankers, and have now three or four men in the county who are checking sales at elevators and trying to determine what farmers have sold grain sufficient to pay the loans and have not paid.

Mr. **Buchanan**. Do you mean to tell us that bankers are opposing the collection of an honest debt?

Mr. **Warburton**. They consider that debts to them are quite as honest as those to the Government, and naturally they want to collect their own.

Mr. **Buchanan**. And they are fighting the collection of the Government debt?

Mr. **Warburton**. Well, it might be considered that.

Mr. **Anderson**. They are considering themselves first?

Mr. **Warburton**. Exactly.

Mr. **Anderson**. In the case of these loans, was a lien taken on the crop?

Mr. **Warburton**. Yes, sir.

Mr. **Anderson**. So that where sales were actually made of a crop after it was raised, is the lien enforceable?

Mr. **Warburton**. In general it is. There are some cases of a prior lien, where a lien had been given on the 1921 crop to a bank or to some other creditor, and according to a court decision that lien would take priority over the Government lien, because it was filed first; that is, the priority was determined by the date of filing. If more time had been available we would have attempted to obtain and probably would have been able to obtain waivers from other creditors in a large number of cases. In fact, we would have made a rule that we would not make loans unless other creditors would waive where mortgages had been filed prior; but the time was so short that it was decided not to attempt to obtain waivers from other creditors. As I stated before, we went on the theory, which I think was justified, that this was a relief measure, and the thing to do was to get the money out there as promptly as possible.

Mr. **Wason**. What was the average price per bushel that you paid for that seed?

Mr. **Warburton**. We did not purchase seed in any case. The loans were cash loans made direct to the farmers, who were to obtain the seed wherever they could.

Mr. **Wason**. Do you remember what the prevailing price was for seed in March and April?

Mr. **Warburton**. I think that quite generally through that territory it would have been possible to buy seed wheat for around $1.50.

Mr. **Lee**. Did you state a moment ago how many borrowed money and then did not plant after they got it?

Mr. **Warburton**. I can not say positively. We had reports of perhaps half a dozen or so.

Mr. **Anderson**. Are there any further questions on this item?

Mr. **Wason**. I take it you did not have much time to exercise discretion in getting loans out?

Mr. **Warburton**. No, sir. It was the fastest job I ever tackled.

Mr. **Buchanan**. I presume you did not have much difficulty in getting applications?

Mr. **Warburton**. No, sir. The difficulty was in examining applications, and determining whether or not the individuals were entitled to a loan; and then, of course, the routine of examining the papers to see whether they were in legal form, and drawing checks and all the other things that were required.

Mr. **Anderson**. I presume where there were fairly good crops, you could probably get enough collections to make it worth while, probably to cover the losses that were incurred?

Mr. **Warburton**. If the prices had been from 25 to 50 per cent higher collections would have been very much better.

Mr. **Anderson**. Is that all you have?

Mr. **Warburton**. That is all I have, Mr. Chairman.

WEDNESDAY, FEBRUARY 15, 1922.

STATEMENT OF DR. E. D. BALL, DIRECTOR OF SCIENTIFIC WORK, DEPARTMENT OF AGRICULTURE, AND MR. A. ZAPPONE, CHIEF, DIVISION OF ACCOUNTS AND DISBURSEMENTS.

PER DIEM RATES.

Dr. BALL. We might take up the item on page 279 while we are waiting.

Mr. ANDERSON. As I understand, this is an item that does not go in.

Mr. ZAPPONE. It is simply a report to the committee of the rates of per diem that will be paid by the department during the fiscal year 1923.

Mr. ANDERSON. No change in that item is proposed?

Mr. ZAPPONE. No change whatever.

Mr. MAGEE. The item in italics, you mean, is not to go in the bill?

Mr. ZAPPONE. It does not go in the bill.

Mr. ANDERSON. That is put in here simply because it was required by law. It is not a part of the bill at all. It is all statutory law.

Mr. BUCHANAN. I do not understand this note, if this does not go in the bill.

Dr. BALL. You are looking on the wrong place, I think, Mr. Buchanan. It is page 279. The secretary is going to speak on page 278, and we would like to take that up when he is here. I asked to pass that.

Mr. WASON. The effect of this law on 279 gives the Secretary of Agriculture the right to save money from the maximum allowance. That is, he can send a man out and allow him $1.20 a day for traveling where he knows that is all he could wisely spend? Isn't that it?

Mr. ZAPPONE. That is the idea; yes, sir.

Dr. BALL. That is done in the authorization we give a man for traveling. The authorization specifies how much he can spend per day.

Mr. MAGEE. Depending upon the locality?

Dr. BALL. Yes. sir.

Mr. WASON. In other words, he is authorized to further limit the per diem expenses of employees from what the State does?

Dr. BALL. Yes, sir. Just the same as this vehicle statute. He does not need to authorize a man 10 cents a mile simply because the law says he may.

Mr. BUCHANAN. We have no such law as this now?

Dr. BALL. That is the law already.

Mr. BUCHANAN. Permanently? Is it permanent law?

Mr. ZAPPONE. The permanent law reads not to exceed $4 a day.

Mr. BUCHANAN. Well, what is the necessity of this?

Mr. ZAPPONE. The law requires that it shall be reported to Congress annually.

Mr. BUCHANAN. Then what is the necessity of this?

Mr. ZAPPONE. There is no necessity of putting it in the bill, but we must make a report to the committee each year showing the rates of per diem proposed to be paid.

Mr. ANDERSON. The law requires it to be inserted in the estimates every year, but it does not become any part of the bill when the bill is reported.

Mr. MAGEE. Of course, this is not in the form of a report. This is in the form of proposed legislation.

Dr. BALL. That is what Mr. Anderson means. It looks like it is proposed legislation.

Mr. MAGEE. If it is not in the bill, I suppose it is immaterial here.

Mr. BUCHANAN. Well, that $4 maintenance runs throughout other legislative bills.

Mr. ZAPPONE. It applies to all departments alike.

Mr. BUCHANAN. I do not see any necessity of discussion on it.

Mr. WASON. It is put in simply as a report to us.

Mr. BUCHANAN. Yes; I understand.

THURSDAY, FEBRUARY 16, 1922.

STATEMENT OF HON. HENRY C. WALLACE, SECRETARY OF AGRICULTURE.

MAXIMUM SALARIES.

Mr. ANDERSON. The committee will take up the item on page 278 relating to maximum salaries in the department. The Secretary is here and we will be very glad to hear him with respect to the salary situation in the department, and of course on any general policies of the department that he may care to discuss at this time.

Secretary WALLACE. I will be glad to take this matter of salaries up first, or as I come to it. There are several matters that I would like to talk to you about.

I have been Secretary almost a year, but I can not say that I am fully informed as yet concerning the work of the department. It is a very large department. I have put in a good deal of time studying it on the theory that I wanted to know the department and its workings in considerable detail.

I found a very fine organization, speaking as a whole. I was surprised at the strength of the organization; the systematic way in which the work is carried on. I found a lot of splendid people among these scientific men, to whom this matter of maximum salaries relates especially. They are a very high type of men. Many of them have been there for 25 or 30 years or even more, and have given their entire lives to that work.

All of our scientific men are limited in salary to a maximum of $4,500 per year, with the exception of the bureau chiefs, who are limited to $5,000, with one exception. In that case the head of the bureau gets $6,000, by a special enactment of Congress, I believe.

The longer I have studied that scientific work, the more evident it is to me that that salary limitation is a piece of wretched business, considered purely from a business standpoint, and also is a gross injustice to the men who are devoting their lives to a very high form of public service. Of course, there is this to be said, that that is the thing in which they are interested, these older men; that is their life;

but I do not think that offers a justification for the community at large to take advantage of them, as it does when it restricts them to a salary which is not adequate for the proper care of their families and makes practically no provision for the retiring period, which comes to all of them. I have had some computations made for the purpose of enabling us to compare the salaries of scientific men with scientific men in other institutions, and I have some of these in comparison with other educational institutions. For instance, take the salaries in some of the leading endowed institutions. At Columbia University the salaries of professors run from $6,000 to $10,000; the salaries of deans about the same. In Harvard the salaries of professors run from $6,000 to $8,000, and the salaries of deans from $6,000 to $12,000. The dean in such institutions is fairly comparable with the leading scientific men in the department.

At the University of Pennsylvania the maximum salaries of professors is $7,000 and of deans $8,000. In Yale $8,000 and $9,000, respectively. In the leading State universities you have got about the same situation. The maximum salaries of professors in the University of Wisconsin is $7,500, Michigan $7,500, Illinois $7,000, California $7,000, Ohio $7,500, Cornell $6,250; while the maximum for deans in those same institutions run from $6,000, in the case of the Ohio State University, up to $15,000 in the case of the University of Michigan.

You can make comparisons of that sort throughout the country and you will find that almost without exception the salaries of men who occupy positions comparable with the positions occupied by our leading scientific men are considerably higher in the other institutions.

If you take it in our own Government salaries, in the Department of Agriculture, they compare very unfavorably with the salaries in most of the other departments of the Government here. What I shall say on this is not for the purpose of being critical of these other salaries. I think they are not too high, but the salaries in the Department of Agriculture are very much lower.

Just a summary of that. In the other arms of Government service there are 7,772 men who get salaries of $5,000 or above, while in the Department of Agriculture there are 19. Those salaries are in almost every other department. We have about 18,500 people in the employ of the department, of whom about 12,000 are on the lump-sum appropriations, so that those who get a salary as high as $4,500 are less than one-half of 1 per cent of our personnel. We have only 74 in all who get $4,500.

EMPLOYEES RESIGNING AND ENTERING OTHER SERVICES AT INCREASED SALARIES.

Now I call that most short-sighted business and grossly unfair to the men. The Government can not compete with large business enterprises. We have got a very striking illustration of that in what has happened to us during the last year or two. We have had a large number of men go out at increases of all the way from $500 up to $10,000 or $15,000 over what are we paying them. I have got a memorandum of that here.

Here are 1,080 of our employees who have resigned to accept salaries which are known to us. There are about 500 others who have gone out at salaries higher, but concerning which we have not sufficient knowledge to speak; in the case of these 1,080, we know what they got when they left.

Mr. ANDERSON. Are those within the last year, Mr. Secretary?

Secretary WALLACE. Those are the last two years; from August 1, 1919, to July 1, 1921.

Seventeen of those got increases of below $100. Three hundred and eighty-four of them increases of from $500 to $1,000. One hundred and forty-seven got increases of from $1,000 to $1,500. And from that it runs up to an indefinite sum.

I have definite information here of 11 who got an increase of from $3,000 to $3,500; 7 who got increases up to $4,000; two who got increases up to $5,000; 1 who got an increase up to $8,000. The total salaries paid to those 1,080 employees by the department was $1,576,884, and the total increase these 1,080 men received in their new positions was $935,366, making an average increase of $866, and an average percentage increase of 59.3. There are about 500 more concerning whom we do not have information sufficiently definite to justify me in using it.

Of these 1,080, 127 accepted positions in other branches of the Government service and 953 went to outside institutions.

We have a shift—not a large shift, but a substantial shift right along—of people from our department to other arms of the service at increases in salaries. Once in a while we suffer a grievous disappointment because of some man that we expected to get, only to find that he had gone to work in some other department.

Now, these men are not out for the money. I can give you a very good illustration of that. I have a position of bureau chief vacant, the Bureau of Chemistry. The chief of that bureau resigned along in June or July. That is, he terminated his work at that time. Shortly after I came here he told me that he expected to leave the work. That was Dr. Alsberg, who had repeatedly been offered other positions at higher salaries, substantially higher increases, and who had refused them because he was devoted to his work; but an offer came along in the direct line of work in which he was interested, nutrition investigations, with a substantially higher salary than we could pay, and he accepted it.

I asked Dr. Ball and Dr. Alsberg to try to find a suitable successor, and they worked a long time on it. One man whom we wanted, who had had experience in the department before, a man of high scientific attainments, had gone out at an increase of more than 100 per cent over what he had been getting in the department. He got $10,000 a year, and we thought we would try to get him back, and he offered to come if we could pay him $7,500. He was willing to take that much of a sacrifice, but in justice to his family he could not do less than that.

It simply shows that other conditions being equal, they prefer to stay in the work in which they have a vital heart interest. But there comes a time when a man must give consideration to his own family, and when that time comes, the Government suffers.

I think you do not care for me to go into detail or read the number of figures into your record here?

Mr. ANDERSON. Would you care to insert those tabulations in the record?

Secretary WALLACE. Well, if you would like to have them.

Mr. ANDERSON. I think the committee would be very glad to have them.

Secretary WALLACE. I will prepare them in more condensed form for you, and be glad to submit them to you. They are somewhat in detail here.

Employees of the Department of Agriculture who resigned to accept positions at higher salaries for 2-year period ending July, 1921.

Amount of increase.	New positions.						Grand total.
	Other departments.			Outside.			
	Scientific.	Clerical.	Total.	Scientific.	Clerical.	Total.	
Below $100	2	9	11	4	2	6	17
$100 to $200	3	27	30	35	21	56	86
$201 to $300	5	19	24	33	38	71	95
$301 to $400	2	9	11	47	43	90	101
$401 to $500	4	6	10	51	50	101	111
$501 to $1,000	14	12	26	241	117	358	384
$1,001 to $1,500	9	4	13	111	23	134	147
$1,501 to $2,000	1		1	60	5	65	66
$2,001 to $2,500				26	4	30	30
$2,501 to $3,000				16		16	16
$3,001 to $3,500	1		1	9	1	10	11
$3,501 to $4,000				6	1	7	7
$4,001 to $4,500				2		2	2
$4,501 to $5,000				1		1	1
$5,001 to $5,500				2		2	2
$6,001 to $6,500				1		1	1
$6,501 to $7,000				2		2	2
$7,501 to $8,000				1		1	1
Total	41	86	127	648	305	953	1,080

Total salaries paid by department to the 1,080 employees who resigned	$1,576,[illegible]
Total increase received in new positions	$935,[illegible]
Average increase	$[illegible]
Average percentage of increase	59.[illegible]

Statement showing larger increases in detail of some of the workers who have left the department for higher salaries.

Department salary.	Total number of men.	$5,000 to $5,999	$6,000 to $6,999	$7,000 to $7,999	$8,000 to $8,999	$9,000 to $9,999	$10,000 to $11,999	$12,000 to $14,999	$1[illegible]
$1,000 to $1,499	2	1	1						
$1,500 to $1,999									
$2,000 to $2,499	3		1	1			1		
$2,500 to $2,999	4	1	1	1				1	
$3,000 to $3,499	9		4	1	1		3		
$3,500 to $3,999	6		2	1		1	2		
$4,000 to $4,499	10			6	2		2		
$4,500 to $4,999	2						1		
$5,000	1				1				

FIXING MAXIMUM SALARY OF SCIENTIFIC EMPLOYEES.

Mr. BUCHANAN. Do the details show the increase that you desire? That is, what the salary will be fixed at if your request is granted?

Secretary WALLACE. In this item in the appropriation we ask permission to pay up to a maximum of $6,500 for these scientific men. I have no intention of at once marking them all up to $6,500. What I would like to have you do is to raise that limit and then we will adjust the salaries to that limitation, according to the character of the work done and according to the qualifications of the man who is doing it. I have no intention at all of marking them all up. I can not give you a list to-day of the men who would be marked up to that limit, if I had authority to do it. Please understand clearly also, that an increase in the maximum which we are asking does not increase our appropriation.

Mr. BUCHANAN. Do not understand me to infer that you would do it, but when we come on the floor of the House some Member will want to know.

Secretary WALLACE. Yes; I understand.

Mr. ANDERSON. How long has this $4,500 limitation been in effect?

Dr. BALL. Eight years.

Mr. ANDERSON. During that time, out of the 18,000 employees, some 74 have reached the maximum limit?

Dr. BALL. Yes. The first year there were none appointed to the maximum limit. The next year there were two, and the next year there were only three, showing that the department has been using very conservative judgment in advancing them. This does not increase our appropriations and therefore it comes right back as a burden on us. If we ask for a statutory increase, we increase the appropriation for the salary and it does not take off any from our work. If we increase a salary in the Department of Agriculture under the lump sum, it immediately reduces the amount that we can use for work.

Therefore no salary will be increased unless in the judgment of the department it is absolutely necessary for the efficiency of the work. That is the limitation that we have.

Mr. ANDERSON. You do not think there would be any disposition to let the work suffer for the salary?

Dr. BALL. There never has been in the department, I am sure. Knowing the Secretary's mind as well as I do, and my own disposition, too, it would only be a question of holding an efficient man and of obtaining other efficient men that we must have. To-day the problem with us is one of obtaining efficient men for the positions that are now vacant. In the Bureau of Animal Husbandry three men last week came before you here. Two of them were new men. We have lost two of the three men who appeared before you last year from the Bureau of Animal Husbandry. We have lost two of them in a year. We have filled one position. We have not been able to find a man yet who will accept the other position at the salary offered; that is, a man whom we consider competent to handle that work.

Secretary WALLACE. In one of our more important pieces of work the man whom I asked to head the work was offered a thousand dollars more than the limit I could pay him. He is a man who needs the money, but I laid upon him the responsibility of the work he was doing there, and his peculiar qualification for doing it, and he yielded to me in that, and has continued there at a thousand dollars less than he could obtain.

Now, in a case of that kind, there will be no hesitation in paying him an adequate salary. We are trying to exercise exactly the same sort of judgment in this that we are exercising in our own business. We are just as anxious to get a full dollar's worth of work for the

Government as I was to get a full dollar's worth of work for myself in the business in which I was engaged. We are just as anxious as anyone over here to save Government money.

Mr. **Anderson**. The general policy of the Appropriations Committee is to wait on these matters for the reclassification bill, which we expect to pass this year, which will be effective in the appropriations for the fiscal year following; that is, the fiscal year of 1924. Now, to what extent would your situation be affected by the necessity of waiting for another year?

Secretary **Wallace**. It will be seriously affected. It is a case of "hope deferred maketh the heart sick." They have been waiting for that reclassification bill so long. It will be a very serious matter in some divisions of our work. We will lose a number of men. Two and perhaps three of our bureau chiefs have had offers as presidents of agricultural colleges.

Dr. **Ball**. Two of those last year. We have held them on promises which we can not fulfill now.

Secretary **Wallace**. Not under the promise that we would advance them, but the promise that we would do everything we could to present this situation clearly to you people.

Mr. **Anderson**. Of course, this limitation would not affect the bureau chiefs, unless you were able to carry them temporarily on the lump-sum roll.

Dr. **Ball**. The announcement of the increase in the maximum for scientific workers would in some ways make more difference to a bureau chief than the advancement of his own individual salary.

Mr. **Magee**. In what way was this $4,500 limit fixed?

Dr. **Ball**. Mr. Anderson may know more about it historically than I do.

Mr. **Magee**. Is it statutory?

Mr. **Anderson**. Yes. It is a limit fixed by law.

Dr. **Ball**. It only applies to the Department of Agriculture.

Mr. **Magee**. Then this committee would have no power to change that limit.

Dr. **Ball**. It has just been a provision in the bill—a provision to limit.

Mr. **Magee**. I do not know whether it has been a provision in the annual appropriation bill, but what I want to know is whether it is statutory law.

Dr. **Ball**. No; it is a limiting proviso. You have a right to put a limitation, do you not, in an appropriation act?

Mr. **Anderson**. We have the right, of course, where, for instance in a new service like the enforcement of the packers and stockyards act, in which the salaries are not now fixed by law, under which the Secretary could, if he desired, fix them as high as the ceiling, so far as any legal limit is concerned, there has been some disposition to fix the limit of the maximum salary that can be obtained because there is no law on the subject now. But in this case there is a maximum fixed by law, and of course any change in that maximum is a change in the existing law which this committee has no authority to report. If we did report it, it would be subject to a point of order, and it would simply be a question as to whether we could persuade the House to let it go by.

Now, we carried a provision last year raising this maximum limit to $5,000, with a further limitation as to the number that might be appointed to that salary. That went out on a point of order on the floor. That would be subject to exactly the same possibility this year, and that could not be avoided if we reported it. I was in the hopes that the committee which has jurisdiction of the legislative proposition would report a bill on the subject, even if it got no further than to report to the House, because that would give us some justification if not legal authorization from the standpoint of rules of the House for raising this maximum.

Mr. MAGEE. I think the situation should be relieved, and I think that you have a lot of very able men there who are entitled to consideration. I simply raised the point in order that you might know exactly what the difficulty is. This committee has power only to appropriate, as I understand, but not power to authorize. As far as I am concerned, I would not have any objections, if my colleagues agree, to reporting an increase in this limitation, but the chances are very slight, I think, of getting by that objection.

Secretary WALLACE. It seems to me the situation should be made very clear, because it is a matter of very great public importance. It is not alone the question of these men who are getting higher salaries. It is a question of being able to bring in younger men, where they can see hope ahead if they go into that work, and it is a question of holding these key men to give inspiration and guidance to the younger men whom they are training and bringing up under their direction.

Mr. BUCHANAN. There is one way we can vote on this in the House. After the bill reaches the Senate, if the Senate raises the limitation, then it will come before the conference committee and the conference committee then—it would be their duty, it being legislation, to submit it to a separate vote of the House.

Dr. BALL. A raise in the maximum salary obtainable in the bureau would enable us to hire as many men, with the same amount of money as we do now. Here is the situation to-day: The young men in the university or college are offered a position in the department at the entrance salary of $1,800. They look at that quite favorably, because institutions do not pay to young graduates $1,800, but when they look it up and they see the maximum that they can ever reach is $4,500, and the maximum that they can reach in any of these other larger institutions is from $6,000 to $8,000 or $10,000 without going out of the professor class, they will not come to Washington at all. If, on the other hand, we had maximum salaries corresponding even reasonably with those other institutions, the men would come to us.

Mr. ANDERSON. Even though he might never reach anything like the maximum?

Dr. BALL. No; but that gives him the opportunity. The very man that we want is the ambitious man who is looking to the future and not to the present salary. So, it is an actual fact that we could get enough men from two to four or five hundred dollars less at the entrance salary, to more than balance the higher salaries, and it would make a very much better organized group of scientists than it does where we are held down to a low maximum which compels us to pay a high minimum to get anybody to start with.

Mr BUCHANAN. There is no future to the service?

Dr. **Ball.** No; the fact is that in the last three or four years it has been most difficult to get the right kind of young men to take the civil-service examinations at all. Five years ago there would be from 70 to 80 to take our basic civil service assistant scientist's examination at one time. The last time that examination was given I think there were 7 or 10 who took it and only 3 of them passed, indicating that only those that were practically failures took our examination at all.

Mr. **Anderson.** That is a serious situation; there is no getting away from that.

Secretary **Wallace.** On this sheet is listed men, some 25 or 30, who have refused salary advances ranging from $500 to $11,000. Now, this is not a complete list by any means.

Mr. **Magee.** You mean in excess of what they are getting?

Secretary **Wallace.** Yes; increases over the present salary of from $500 to $11,000. It is not a complete list, because you understand the difficulty of getting that information, but I went to considerable pains this summer to get what I could of it. I have got their names here with the name of the concern, in most cases, which offered them the salary.

One very striking one is a young man whom we are paying $4,000, who was offered an advance of $11,000. Of course, that young man sooner or later will go, but he was so thoroughly interested in the particular work he was doing, and felt that it was so much worth while, that he declined that offer at that time.

Mr. **Lee.** Do you want his name to go into the record?

Secretary **Wallace.** No; I would rather not. It is rather a personal matter.

Here is another man who has had three offers in the last year and a half; one of an advance of $3,000; another an advance of $7,000; another an advance of $8,000, and he has still remained with us. Here is another one who has had two offers, one by an educational institution at an increase of $2,000; another from a commercial organization of an increase of $7,000.

Here is another one who has been offered an advance of $6,000. So they run down the line. It serves to illustrate the devotion of these men to their work.

Now, there is this to be said, that in the first place the Government can not expect to compete with commercial organizations. Here is a man of high technical attainment who can earn so much more for a business organization that the Government can not hope to compete in the matter of salaries, but if that man is of the usual scientific type, thoroughly devoted to his work, and if he is able to get from the Government a salary that he feels will permit him to do justice to his family, and if in addition he is in a sympathetic environment and has facilities for carrying on the work in which he is so much interested, then in a large number of cases he will stay with us. On the contrary, if the environment is not favorable, or if he sees no opportunity for further advancement, we are greatly handicapped in trying to keep him.

That is the type of man we must keep if we are going to do justice to the great American public. The loss to the Government through losing these men can not be computed. Not only because we lose the men themselves, but because we lose their experience and their inspiration to other men who are coming in and working under them, who are being built up to take their places.

There is a certain benefit which will come to the community at large through going out into commercial enterprises of a certain percentage of these men. There should be a flow back and forth, not only into commercial organizations, but into educational institutions, but that flow should not be so great as to really impair the work of the department.

For your information I will say that we are trying to give these men attractions in addition to monetary attractions. I don't know whether Dr. Ball has told you about our graduate school?

Dr. BALL. No, I have not.

Secretary WALLACE. We have set up a graduate school there, and we have entered into an arrangement with some of the universities and colleges which offers opportunities for men to perfect themselves in their chosen lines of work without cost to the Government. That is a helpful thing in building up the morale of the department, and one of the means we are using to try to hold some of these men who are staying at a financial sacrifice.

Mr. ANDERSON. That is the great difficulty that the Army medical service has. They have had no opportunity for graduate work outside of the Army, to keep themselves up to the progress of the science. It is a bad thing for the doctors; it is a bad thing for the Army; it is a bad thing for everybody else.

Dr. BALL. That is one of the handicaps with which we have to contend.

STUDENTS FOR GRADUATE WORK.

Secretary WALLACE. Do you care to have Dr. Ball tell you something about that graduate work?

Mr. ANDERSON. I would be very glad to.

Dr. BALL. We started this graduate work this year, and we have at the present time 186 students that are paying $25 a year apiece for one course which they take after hours, in which the instructors are furnished by some of the leading universities of this country, or from our own department. We have men from Johns Hopkins University and the University of Maryland. We expected to have one from Wisconsin.

Mr. BUCHANAN. Scientific work?

Dr. BALL. All scientific work, all training in the lines of our work. It is self-supporting. We make the teachers work for almost nothing. The institutions of this country have responded remarkably to just that little effort. Since we inaugurated that and sent out notices of it, we are beginning to receive requests from young men in the universities inquiring about the opportunities in Government work that they would not even consider before.

Mr. BUCHANAN. It gives them sort of a postgraduate course?

Dr. BALL. It gives them a postgraduate course under high-standing scientific men.

Secretary WALLACE. We are profiting at that at their expense, because the more they get of that the more valuable they are to us, in the Government work. Heretofore, in recent years, when some young men in an agricultural college in some State has raised the question with his president or with his professor about Government work or departmental work, too often the answer has been: "Oh, forget that; there is no field there. Go into this institution or that institution, but do not waste your time with the Department of Agriculture." That has been the feeling that has pervaded many institutions.

REORGANIZATION OF SCIENTIFIC WORK.

Mr. BUCHANAN. Can you give a general idea about how many scientific men you have at the Department of Agriculture?

Dr. BALL. Approximately 2,500 technical scientists. About 3,700 scientific men.

Mr. ANDERSON. Does the latter include the first group?

Dr. BALL. Yes. But when you get down to men that are doing technical research work, there are about 2,500. That is more than there are in all the other Government bureaus put together.

Mr. BUCHANAN. More of that class?

Dr. BALL. Yes, sir.

Mr. PUGSLEY. There are a great many more technically trained men, however, who are doing regulatory and other types of work, like extension work, who are scientifically trained, but who are not in research activities.

Dr. BALL. Oh, yes.

Secretary WALLACE. There is one thing that should be considered in connection with this whole matter, and that is the agricultural problem that we are coming into; the problem that we have got in the future of feeding our people and maintaining our agriculture.

Of course all of you have thought of that. We have come to a time now when, as our population increases and we have got to increase our production mostly through larger yields on the land already under cultivation. We can add some cultivated areas by irrigation and by drainage and by clearing off stumps, but in the aggregate that will be small relatively; our main increase in production has got to come from growing more on the land already under cultivation. It places a greatly increased responsibility upon the scientific research work. Not only in production, but in marketing and in everything that will tend to increase production and reduce the cost of distribution.

We are getting into a period of very severe competition, aggravated by an apparently permanent increase in our freight rates. There never was a time in our history when the importance of this fundamental research work was greater than it is now, or when it was more necessary that we not only maintain our present corps of research workers, but strengthen them right along.

I would like to speak to you for a moment on some of the reorganization work we have been trying to do. You remember I talked to some of you last summer about the proposed reorganization of the scientific work. This agricultural depression directed our attention very sharply to what might be done in the department to help relieve it. We found work in agricultural economics of one sort or another in three different bureaus there, two of which were consolidated last July through the provision made in the appropriation bill last year. I talked with some of the members of the Agricultural Committee of the House and the Senate, and they seemed to agree that it would be a wise thing to bring in that other bureau or office of Farm Management—it is equivalent to a bureau—into the reorganization of the Bureau of Markets and the Bureau of Crop Estimates. They seem to think that would be a good thing to do. So I have been working to that end and have, for all practical purposes, got that organization well underway now. We propose to call that the Bureau of Agricultural Economics, in which will be the work heretofore done by the Bureau of Markets, the Bureau of Crop Estimates, and the Office of Farm Management.

Tentatively we planned setting up in that nine subdivisions—one dealing with farm management or organization of production, another dealing with cost of production and distribution, a third with farm land economics, a fourth with rural organizations, a fifth with agricultural prices and statistics, another with agricultural adjustments, another with agricultural finance, another with agricultural competition and demand in foreign countries, and last with marketing of farm products.

That reorganization will, I think, greatly strengthen our entire economic work. It will incidentally save some money and will enable us to mobilize all of the men who are working in economics to attack any particular problems.

I don't know whether anything has been said to you here about the name. There has been some discussion about the name, because I have spoken of this to various people who are interested, various farmer organizations. It is not thought to drop the name "markets" in dealing with market organizations and market cooperative work. We will have a division of markets, so that the name will be retained; but the name of the bureau itself is a broader name than the Bureau or Markets or the Bureau of Crop Estimates.

Mr. LEE. You would still retain those subheads?

Secretary WALLACE. Oh, yes.

Mr. LEE. Under their names?

Secretary WALLACE. They would be divisions under that bureau.

Mr. LEE. I think that is very wise. I was afraid you would undertake to simplify the whole business and drop those names.

Secretary WALLACE. No; there will be no impairment of the work of those different divisions.

Mr. LEE. I understood that.

Secretary WALLACE. In fact, it will be strengthened.

Mr. LEE. But I was afraid you would drop the particular work.

Secretary WALLACE. No; there will be a Division of Markets, a Division of Farm Management, etc., instead of the Office of Farm Management.

After very full consideration, that name, "Bureau of Agricultural Economics," seemed to be the one name that embraced all of the activities under it, and also it has the advantage of brevity.

Now, there are a number of lines of reorganization that it occurs to me can be done there, and I have made a beginning in some of them.

Having been a publisher for 25 years, I was particularly interested in our publications, and in the past I have been somewhat critical at times of some of the publications put out from the department. Within the first two weeks after I came into the department I asked them to bring to my desk all of the publications which the department had put out during the preceding six months, with the expectation that I would go through them and make a study of that whole matter. Well, there was more work to be done there than I had anticipated. I see by your smiles that you realize that. Every time I looked at that pile I felt discouraged. Then some publication would come through that would irritate me very much. Finally, it became very evident to me that I could not hope to give that personal attention to publications which I wanted to give. At the same time I am sensitive to criticism of the publications, because many people feel that with my long experience as a publisher if something goes out of there that ought not to go out I should have known better. I finally solved that, I think, very satisfactorily by securing the consent of Mr. Pugsley to come in as Assistant Secretary. He has had experience in farming and farm publication work, and he has also had experience in extension work, and those two things were assigned especially to his charge. As a result of the work since he has been there, we have made some changes that I think are very much worth while and that will save us money and will also improve our publications considerably.

I may say also that I asked a committee of experienced agricultural editors from different parts of the country to come here last summer, and they spent a couple of weeks, most of them, going through all of out publications, and doing what I had hoped to do myself. They drafted a report to me with certain recommendations. They brought in the people from the various bureaus and talked to them about specific publications which had come under their criticism, and then following that came Mr. Pugsley, and I think we have made real progress toward an improvement of our publications.

We have combined some of the periodical publications; we have dropped the Weekly News Letter, for example, which had a circulation of 126,000, and we have combined three publications, "Market Reporter," published weekly; "Crop Reporter," published monthly; and "Crops and Weather," published weekly, into one publication which we call "Weather, Crops, and Markets."

Mr. LEE. Published how often?

Secretary WALLACE. Published weekly. That combination, as near as we can estimate, is now saving $12,500 a year, and I am sure that we have a much better publication than we had before. It has a circulation of about 130,000.

Mr. LEE. Does that go free?

Secretary WALLACE. Yes. That circulation has been enlarged by sending it to various volunteer observers, but we are getting weekly news letters, about the only thing that they get for the work they do for us.

Mr. LEE. You send it to the newspapers?

Secretary WALLACE. Yes, sir.

Mr. LEE. To all of the newspapers?

Secretary WALLACE. No, sir; not all of them.

Mr. PUGSLEY. To those who make requests. If a paper can show reason why they need it. There is no subscription list on this "Weather, Crops, and Markets."

Mr. LEE. How many newspapers are there in the United States?

Mr. PUGSLEY. There are a few over 22,000 in the United States and Canada. There are over 21,000 in the United States alone.

Secretary WALLACE. A very small percentage of those get this publication.

Mr. PUGSLEY. Oh, yes; only a few of them.

Secretary WALLACE. The agricultural papers get this, but even they have to make requests, and they have to show that they want it.

Now, on the bulletins that are sent out, we are under great difficulty there on account of the limitation in salaries. We can pay our editor only $3,000, which is not as much as I paid a second assistant in my own office, and when you consider the tremendous amount of literature we are putting out and the importance of it, and its widespread distribution, that is a very uncomfortable and unsatisfactory situation.

Mr. PUGSLEY. That is a statutory provision. In that connection, our last editor left a few months ago to accept a similar position in the War Finance Corporation at a $1,500 increase.

Secretary WALLACE. And the one before that was getting what?

Mr. PUGSLEY. They all got $3,000 a year for the last several years.

Secretary WALLACE. But the one who left before our last editor?

Mr. PUGSLEY. I don't know what his increase was.

Secretary WALLACE. He was getting more than that, his first increase, with the Farm Bureau Federation.

Mr. PUGSLEY. Oh, yes. He got an increase of $4,000 above what he was getting when he went to the paper, and then he came back to the Farm Bureau Federation.

Secretary WALLACE. We can not hope to hold a competent editor there at $3,000 a year. We can get a good man for a time, but he is constantly open to invitation at a substantially higher salary. All I can say about these publications is this, that both Mr. Pugsley and I are very much concerned over this matter.

In your testimony, Mr. Pugsley, did you speak of the limitations we are under now in our publication work?

Mr. PUGSLEY. The statutory?

Secretary WALLACE. No; I do not mean the salaries. I mean our periodical publications and also in the bulletins.

Mr. PUGSLEY. I thought that was covered, as far as the periodicals were concerned, rather fully. Mr. Johnson made the statement here in connection with the periodicals. As far as the bulletins were concerned, it was only discussed briefly. The limitation to the amount of the farm bulletins is the only limitation, I think, outside of the amount of the appropriation.

Secretary WALLACE. We are making some reorganizations in that division. Our motion-picture work, for example, is in that division of publications, which is not a good organization. That is in the nature of extension work and ought to be essentially in the extension division. I have taken out the division of exhibits from publications and attached that to the Secretary's office, where it can come directly under Mr. Pugsley's supervision. I have done the same with the press service. We are trying to make such changes as will increase the efficiency of the organization, doing the work and also making for better administration.

In the extension work, which is also under Mr. Pugsley's direct supervision, we are making quite a reorganization of that, after consultation with the extension people in the various States, and with their full approval, I think.

Mr. ANDERSON. Do you want to tell us something about how that reorganization is being accomplished?

Secretary WALLACE. Mr. Pugsley is more familiar with that, I think.

Mr. PUGSLEY. That was not covered by Dr. True?

Mr. ANDERSON. No; I don't think so.

Mr. PUGSLEY. I was not here when Dr. True started. I could not be here.

The reorganization of the entire extension activities or those activities which come in contact with the public in other ways than regulatory is a thing that we are giving considerable thought to now as a starter, and we are doing a few of those things that the Secretary has mentioned, by transferring from the divisions where they did not logically belong some of these things to the Secretary's office, and then when we get entire reorganization of the public contact work they will drop into their logical places.

So far, in addition to the transfer of the exhibits work and the press service to the extension office, we have combined the extension office of the North and West and the extension office of the South into one extension office in the States Relations Service. Now, that necessitated either adopting the plan of organization in the North or the plan of organization in the South, or establishing a new plan. In conference with extension directors, land grant and college people with whom we cooperate under the Smith-Lever law, and under the law appropriating money to the department for extension work, it was decided that neither of the organizations then existing was the best that could be made. We therefore adopted an organization which has three divisions, the division of project work, which service retained the statement of how the money is to be spent in the States or in the counties; a division of subject-matter workers and a division of organization workers.

Briefly the project division will devote its attention to the outlining of the national agricultural program from an extension standpoint and from the standpoint of districts, and be all of the help it can to the States in outlining their State and county problems by bringing to them the things we have found in connection with the world, national and district situations.

The second division, or the subject-matter division, will give such aid as the department can give in furnishing technically trained workers to carry out the provisions of that adopted program. That means extension specialists within the department or scientists within the department who can go to the States and take the results of the scientific work of the department.

The third division is composed of people who are making a special study of how to get the men, women, and children on the farms interested in this unit extension program. In other words, it is constituted of organizations of people within the counties to bring about the accomplishment of the purpose for which the extension funds were appropriated.

The main difference between the new plan and the old is this, briefly stated, that the old plan divided the work along lines of sex and age. You had the division of county agent workers; the division of home economics workers; the divisions of boys and girls club workers in the office here at Washington. The office at Washington asked for State leaders of these divisions in the States, and they asked for agents within the counties, and along those three lines we actually have existing now within most of the counties within the States, agents for men, agents for women, and agents for boys and girls without any corelation of the three lines of work. This new plan treats the extension problem as a unit and attempts to make a balanced agricultural program out of it, without the lines of cleavage along unnatural divisions.

Mr. **Lee**. In other words, you would have just one agent in a county to handle the farm interests; the girls work and the boys home club work?

Mr. **Pugsley**. We are allowing the States to work along the lines that they think most desirable and most effective within their States. Practically all the extension directors are agreeing with us now that the logical way to handle the work is to have your extension director not only within the States, but also to have a director of extension activities within the county, with assistants as the size of the county and the importance of the work demands, instead of having two or three separate agents not responsible to some one person administrationally in each county.

Secretary **Wallace**. Does that cover about what you had in mind, Mr. Anderson?

Mr. **Anderson**. Yes. As I said before, I think there are a good many people up here on the hill who feel that the specialist end of this game is rather overemphasized.

Mr. **Pugsley**. I think that is true, Mr. Anderson, but I think that comes particularly from a misunderstanding of what the specialists are doing. I think they feel that the amount of money that is paid to workers that go out from a central plant in the State or from the Department of Agriculture here is money spent for administration purposes. Now, that is not true, particularly in the States.

There are some counties that can not afford a county agent, and in many of the States, particularly of the poorer States, several of the counties are grouped and have to depend upon the same person, either located in that division or else located at a central plant, who do the work exactly as the county agent does it, except covers a very much larger territory. I believe that by next year, knowing this misunderstanding, which is a perfectly natural misunderstanding in the way the statements have appeared, that I can make these features so that you will clearly see just exactly what the money is spent for. It will not appear as if it is administration money.

Mr. **Anderson**. I have this impression about it: I recognize the advantage of having technically trained men who work with and discuss problems which require technical consideration—questions of horticulture and spraying, treatment of diseases, and things of that sort—but, after all, the man who goes down to a county semioccasionally from a university or from the Department of Agriculture, does not have the contact that the local man does, or the acquaintance or influence in the community. Besides that, he wastes an enormous amount of time and money in traveling around the country making contacts that are necessary for him to do any good. I do not think it is simply a question of the Members of the House feeling that too much money is spent in administration. I think there is also a feeling that the thing is too much from the top down and too little from the ground up.

You can not reach a whole lot of these people on the basis that you are talking to them from a university. You have got to get to their problems on the ground, and from the standpoint of the farmer himself. I know that there are a great many farmers who feel that sort of uplift proposition, even though it may be educational in character, does not have the influence that it would have if it had closer contact with the farmer's problem from his point of view, rather than from the scientist's point of view.

Mr. PUGSLEY. I agree with you absolutely on that, Mr. Anderson. I agree that the situation should be first a person in the county and second only a sufficient amount of specialists to supplement that work and make it most effective.

Secretary WALLACE. You can see, Mr. Chairman, that this reorganization is aimed at the very thing that you have in mind; that instead of having people who are committed to one phase of the extension work going out independently into the county and stirring up interest in that particular thing, we are making an organization which merges them all into one, and I think it will result not only in a substantial saving in time and travel expense, but it will result in great improvement in the work along the exact lines that you have in mind.

Mr. PUGSLEY. Let me show you just exactly how we work under that organization and why it has brought about just the criticism you have made. Where you had the county agent division you had not only your supervisors here and in the States, but we are looking at the county agent work as a problem; but you also had in there certain other specialists who were dealing with projects on the subject matter, in the county agents' sections. You had also your organization people who were studying the problems of organization. Now, you had that thing exactly duplicated in your home economics section; you had it duplicated in your boys and girls' club section, but by this combination we have made here, this reorganization, you have grouped your organization people in one place; you have grouped your specialists in one place; you have grouped your project people in one place; so that I am thoroughly convinced that the reorganization will save a considerable amount of money, after we get it properly operating, and will lessen the criticism to a very large extent that you have just made.

Secretary WALLACE. That exactly was the thought in the reorganization.

Mr. ANDERSON. Well, that is the reason why, if there was anything in your mind or the mind of your associates with reference to this proposition, I wanted to bring it out.

Mr. LEE. For instance, take a little county, my county, we have the county administration agent, a man. Then we have a woman who talks to the women occasionally and they will have specialists, you know, on chickens and such things. Now how, in a practical way, will it work out? What will you have in my county, for instance?

Mr. PUGSLEY. We will have the same thing in your county, except that you will not have so many people coming in there to supervise the thing administratively as you have in the past. In the past you have had people who have come into the county to talk about projects from the legal division; the women's division; the men's division: and if you had junior work you would have the junior division. Then you have had somebody come in there and talk about the method of organizing one of those three, and then you have had some one come in on the specialists' line.

This reorganization means that some one will come in to talk projects for the whole group. Somebody will be administering the organization end the most effective way of carrying it out for a whole group. As far as your agents are concerned, within your own county, that is a matter for your farmers and your people within the county to determine how many they need and how many they will provide for.

Mr. LEE. Yes; they put up the money.

Mr. PUGSLEY. Yes, sir.

Mr. LEE. I have been very much interested in that work. In fact, I think I have had as many boys at work in my district as most any district in the United States. In other words, we have over 5,000 boys on a corn job. But we just had a man to direct them.

Mr. PUGSLEY. He was the county man?

Mr. LEE. No; he was not.

Mr. PUGSLEY. He was a man that come from the State?

Mr. LEE. Yes; he was sent there by the department, perhaps through the university.

Mr. PUGSLEY. Undoubtedly through the university. Did he devote all of his time to the county?

Mr. LEE. Yes; not my county, though.

Mr. PUGSLEY. Then he must have been receiving some county salary?

Mr. LEE. Oh, yes; we paid half of it or more.

Mr. PUGSLEY. Then he was really a local man.

Mr. LEE. Well, he was not a man taken from my county, of course.

Mr. PUGSLEY. No; but he was a man that you brought in there.

Mr. LEE. Yes. They have done good work. Of course, there has been some complaint that they did not touch everything when they came in there.

Secretary WALLACE. We have been finding that there are a number of things that can be done to strengthen the business administration of the department and at the same time save money. For example, we have consolidated the multigraphing and mimeographing into one place. That consolidation enables us to turn back to the coordinator some $19,000 worth of machinery. We think it will result also in getting more mimeographing and multigraphing work done and more promptly and more efficiently. Consolidation of the purchases, while of unusual difficulty in a department of that kind, evidently will make some considerable saving, and we are working on that, trying to bring it about as completely as we can.

In all of this reorganization work we are hampered somewhat by the rather inflexible organization that we have as a result of the statutory salaries. At times it is necessary to transfer a man from one place of work to another to get the most out of him, and sometimes that might seem as if the money is not being spent for the specific purpose for which it is appropriated. That is not the case, however. It may not be spent in the exact place it was originally appropriated for, but it is being spent for the purpose for which it was appropriated. As we get through with this, if we have another year at it, as we get through with this reorganization plan, it will be much easier to give you an accurate record of exactly how the money was spent and where it was spent. In other words, it will enable us to adjust our budget in a much more businesslike way than we can now. We have to keep in mind all the time that the work of the

department must go forward. As the work piles up in my office it is necessary to bring in a man for some new work that has come in there, or to transfer temporarily a man from some other place in the department. I have been rather restive under that, but I have not found a way to avoid it as yet.

SECRETARY'S OFFICE.

That is why I wish a sufficient appropriation could be made to the Secretary's office to take care of all of the work there, as the more experience and the more I see of it, the more it will result in the greatest economy of expenditures.

One thing more that I want to say something about is the statistical work. I spoke to you about that the other day. I told you that we were examining that with a great deal of care ourselves. We have had recently a special committee going through the whole statistical organization. We have had Mr. Doten, statistician of the Massachusetts Institute of Technology of Boston; Prof. Persons, statistician of Harvard University, and Prof. King, statistician of the National Bureau of Economic Research. We brought these men in and asked them to go right through and make a critical examination of all of our statistical methods and everything pertaining to the work, with the determination that we will strengthen that work wherever it seems to need strengthening. I think we shall get a good deal of help from that committee.

I want to reemphasize the importance of that statistical work. It is basic; it is fundamental to the building up of our agriculture. And I want to say again that the money we have asked in the way of an increase for that work is far less than I would have asked under normal conditions, in normal times. It is the minimum which I think we should have for this coming year.

Now, about this budget. I would like to tell you just how we went about the preparation of the budget this year.

The various bureaus prepared their budgets as usual.

Then the bureau chiefs came to my office, and I think we spent some eight or nine nights in succession going over those budgets with the bureau chiefs—Dr. Ball and I—and we made a great many cuts in them ourselves, because we realized the need of economy now. I do not think any one realizes it more than we do, because we are in close touch with the agricultural situation all over the country.

The bureau estimates as originally submitted were $38,397,912. We cut them to $37,083,138, about a million and a quarter which we cut the budgets in my office.

Now, in making those cuts we eliminated some work that we would like to have done, some work that ought to be done; but we approached the matter just exactly as if it were our own business. We would like to continue this work; it ought to go on, but in view of the situation, can we get along without it for a time without serious loss? Can we get along without this item this year, or this item or the other item? That was the spirit in which we went through the budget. We played absolutely fair with the budget committee on that, and when we presented the budget to them finally it was with the conviction that every dollar asked for should be granted; that we had not asked for a dollar which we felt should not have been asked for.

As the estimates were finally submitted by the budget committee, the total amount, $34,610,668, was decreased $1,673,991 as compared with last year. We are trying to play teamwork with the budget committee. Our budget has been cut to the bone; that any further reduction will simply mean a reduction of work which we consider necessary and profitable to carry on. There may be here and there expenditures which may be lopped off, but I think in practically every case, if they are, it will simply lop off that much work for which we would get no returns.

I want to say further that in administering the money which was appropriated this year we are doing it in exactly the same spirit as we would administer our own business. If there is an opportunity to save money, the money will be saved. We are not going to spend a cent which we can avoid spending. We are not going to spend a cent extravagantly. We are going to try to get the very greatest value for every dollar that you give us.

And that is the spirit of the leading men in the department. They scan their expenditures with care. They adopt devices of economy wherever possible. We have got a fine lot of men there, and they are very faithful not only in their work but in their expenditure of Government funds.

Until the last six weeks we have been having meetings of the bureau chiefs in my office on Mondays—and I hope now to resume those—in which we discuss all matters of general department interest, which have been very helpful, and the agricultural situation as a whole has been presented constantly at these meetings. The importance of economy has been urged repeatedly.

Mr. **Magee**. What do you find about the agricultural situation? Do you think it is gradually improving, Mr. Secretary?

Secretary **Wallace**. There is some improvement, due to the increased prices of grains and live stock.

BUILDINGS OF DEPARTMENT.

Here is another thing that I would like to call your attention to, showing the waste both in money and time: Here is a map showing the buildings in which the department is housed in different parts of the city. I think there are some forty or more different buildings in all. We have got the weather service away over here; we have got eight different buildings scattered over the business part of the city. That means a waste in two or three ways. It means waste in supervision. Where you have a unit off by itself, you can not give it the supervision that you can when it is close at hand. It means waste in messenger service. It means waste in the lack of opportunity for these men to consult easily with the other men in related lines of work, but in a bureau located half a mile or a mile away. The whole arrangement is terribly wasteful.

Then in the buildings of the department we have got a lot of waste because of the crowded condition and the inconvenience to which we must put people to carry on their work. There is a very urgent need for at least one big good office building. I am not urging this on you now, you understand, but it is a matter that you ought to be thinking about. Something must be done in the near future.

Mr. Lee. This costs the Government a great deal more money than it would to go ahead and put up their buildings.

Secretary Wallace. Oh, yes.

Mr. Lee. Take the Forestry Service, way down on F Street; a little 22-foot building there bringing in twenty-four to thirty thousand dollars a year rents.

Secretary Wallace. Well, we have got an increase on that now, you know, to $35,000, or something like that. The increase I think was $12,200, but still that is a very low rental, compared with other rentals.

Mr. Lee. Do you think so?

Secretary Wallace. Yes, sir.

Mr. Lee. If you got off of F Street, I believe you could get a building cheaper.

Secretary Wallace. That figured something like 40 cents a square foot.

Mr. Anderson. Forty-three cents.

Secretary Wallace. Yes.

Mr. Lee. Take the Department of Justice. I understand that the man that put up that building had a contract with the Government that in about eight or nine years it pays for itself.

Secretary Wallace. We have got one or two pressing situations there. Take our motion-picture work; that work is in the basement of the Bieber Building, which houses the Bureau of Markets, Crop Estimates, the Biological Survey, the library, and others. The films are stored right under the entrance to that building. The authorities of the District of Columbia have protested against that, and we have been trying to find a place where that can be put, so far without success.

Mr. Lee. How about these big buildings down on Potomac Park there? Aren't they fireproof or pretty substantial buildings?

Secretary Wallace. You mean where the War and Navy Buildings are?

Mr. Lee. Yes.

Secretary Wallace. There is no space available there that I know of.

Mr. Lee. Well, you walk through there and you will see a lot of it.

Dr. Ball. But you can not get at it.

Mr. Lee. There is plenty of space there. Perhaps they anticipate another war.

Mr. Anderson. Now, is there anything further, Mr. Secretary?

Secretary Wallace. I think not, Mr. Anderson.

Mr. Anderson. Very well, then; the committee will take a recess until 10 o'clock to-morrow morning.

SATURDAY, JANUARY 28, 1922.

DELEGATION FROM NATIONAL ASSOCIATION OF COMMISSIONERS OF AGRICULTURE ON INVESTIGATING THE DISEASE OF TUBERCULOSIS OF ANIMALS, FOR ITS CONTROL AND ERADICATION.

Mr. ANDERSON. The committee will take up the item on page 26, estimates for investigating the disease of tuberculosis of animals, for its control and eradication, for the tuberculin testing of animals, and for researches concerning the cause of the disease, its modes of spread, and methods of treatment, etc.

This carries an appropriation for the current year of $978,000. Mr. Norgord, I understand you are to take charge of the hearing on the part of these gentlemen who are present.

STATEMENT OF MR. C. P. NORGORD, COMMISSIONER OF AGRICULTURE, STATE OF WISCONSIN.

Mr. NORGORD. I am commissioner of agriculture of Wisconsin and also president of the National Association of Commissioners of Agriculture.

Gentlemen, we are appearing here as a group of commissioners of agriculture, constituting a committee appointed at the last annual meeting of the National Association of Commissioners of Agriculture last December to appear before your committee and represent the association on the question of tuberculosis-eradication work, accredited herds, and area test work, especially on the question of funds for operation and indemnity. This is a subject which is vital to practically every State in the Union. The accredited herd work was started as a cooperative project between the States and the United States Department of Agriculture in 1918. To-day the project is under operation in practically every State in the Union. We have to-day a total of 11,587 accredited herds in the United States, as reported December 31, 1921, constituting a total of 268,411 head of cattle. This project has become of immense interest to every State in the Union and under it great progress is being made in the eradication of tuberculosis.

Mr. ANDERSON. How long has this work been in progress?

Mr. NORGORD. This work started as a cooperative project in the fall of 1918. In addition to the herds that are actually accredited, there are under supervision herds that have had one clean test, a total number of herds of 133,481, constituting 1,871,664 head of cattle.

RESULTS OBTAINED IN WISCONSIN.

The State of Wisconsin has operated under the accredited herd plan since 1915. The cooperative work with the United States Department of Agriculture has been of great value as a stimulus and backing to the State work. The testing and establishment of accredited herds has gone forward with great enthusiasm and speed. In fact the department has been unable to keep up with the demand, and from 500 to 1,000 herds have been on the waiting list continually. The State of Wisconsin now has 1,455 accredited herds containing 33,805 head of cattle, 1,718 herds which have passed one clean test containing 38,611 head of cattle and 33,089 herds containing 98,705 head of cattle under supervision.

Mr. ANDERSON. May I ask you right there whether this work is done with any classes of cattle except dairy cattle?

Mr. NORGORD. Yes, sir; this is a project that applies to all bovine animals.

In addition to the accredited herds we have another project that the States and the Bureau of Animal Industry are starting, namely, accredited areas and counties, otherwise known as the area test plan.

The State of Wisconsin started that project in 1917. To-day the project is rapidly being adopted as the most effective method of eradication throughout the United States. The fact that the entire area is cleaned up and all of the herds that are contiguous are clean and under State regulation makes it difficult to transfer any untested animals into a tested herd to reinfect the clean herds and the clean animals. That is the special value of this new phase of the work.

Mr. ANDERSON. What is the unit of the accredited area activity?

Mr. NORGORD. In the State of Wisconsin the unit is the county. The county border is a well known border, and a regulation can be applied to that border more easily than to a township or border of a smaller area.

Mr. ANDERSON. How many clean counties are there in the United States now?

Mr. NORGORD. I can not give you the number of clean counties in the United States. In the State of Wisconsin we have four counties that have been cleaned up and four under process of test at the present time, and ten with petitions in or to be in before spring.

The first county to be tested in Wisconsin was Waukesha, just west of Milwaukee, one of the leading dairy counties in the State, containing 50,242 head of cattle. All of this but two townships was completed in 1919. Washington Island, a small island north of Green Bay Peninsula, was completed in December, 1919. Barron County, containing 68,000 head of cattle, was completed January 1. 1920; Lincoln County, April 1, 1921; Bayfield, in November, 1921.

Mr. ANDERSON. Let me ask you, in those counties where you are supposed to have accredited areas, if the work is done by compulsion of State law or voluntary?

Mr. NORGORD. There are two policies pursued at the present time. In Michigan, in Hillsdale County, this plan was put in operation without a compulsory law, and I believe between 95 and 100 per cent of cattle in this county were tested voluntarily.

The State of Wisconsin started this project in 1917 by the passage of a law, known as the area test law. This has been modified since, and to-day provides that when 60 per cent of the cattle owners of any county or contiguous area sign petitions requesting the Department of Agriculture to come in and test all of the cattle in the county or area, the department is authorized so to do.

The advantage of this policy is that all of the cattle in the area are tested. No untested infected herd is left to reinfect the clean herds by contact over the fences and through streams or by transfer through sale from the infected herds to clean herds in the community. The importance of this feature has been demonstrated again and again not only in tuberculosis eradication, but also in the eradication of bee diseases. In the latter work, where American foul brood is removed from one apiary which is surrounded by untreated apiaries, the treated apiary soon becomes reinfected, but in Wisconsin where the area method has been applied to bee disease eradication within the past five years we have demonstrated that when all of the apiaries are freed from the disease they remain free and clean.

A further advantage of the area method when conducted by authority of law lies in the fact that the law gives authority to issue regulations prohibiting the entrance into the cleaned area of any infected animals, or animals which do not come with a clean bill of health. The same regulations are applied to the county borders as now obtain in connection with the State lines under Federal law. Furthermore, under the Wisconsin regulations animals from herds where reactors were found and removed can be moved into or within the county only at the discretion of the inspector in charge, and depending upon the amount of infection which was found in the herd. Experience under the regulations issued by the Live Stock Sanitary Board of the Wisconsin Department of Agriculture shows that the people stand behind them, are eager for their enforcement, and that they can be successfully enforced.

A policy scrupulously adhered to by Wisconsin is that no propaganda and undue pressure must be brought upon the people to get them to sign petitions for this compulsory eradication work. We believe that the signature of the petitions and the demand for a compulsory test should constitute a normal expression and demand of the people which they will stand by at all times under normal conditions.

Mr. WASON. Have you had to resort to that in any one of your counties in Wisconsin yet, to force them to clean up the county?

Mr. NORGORD. Yes; we had to resort to court action in one county.

Mr. WASON. I mean forced the herd owners to allow you or the Government to come in?

Mr. NORGORD. Yes, sir; we have forced the test.

Mr. WASON. Did any of them seriously object?

Mr. NORGORD. We have had objection in two instances, one in the first county, Waukesha County, where we attempted it. An injunction was served. We did not wish to go into court just then, therefore, left two townships to be completed later. In Barron County, the second county that we operated in and cleaned up, we had two men who objected and had to apply the law. Those men were taken into court and fined $33 apiece. They came back to their farms the next day and found their herds tested. They declared that it was a cheap piece of work and satisfactory.

This was the needed test of the law and the attitude of the department toward carrying it out. It had a most healthy and salutary effect not only in Barron County but throughout the entire State. It brought respect for the law and the work and confidence on the part of the stockmen that their efforts in securing petitions would be crowned with success in securing an entire clean-up.

Mr. WASON. In Waukesha County you say a township objected to it?

Mr. NORGORD. We had an injunction served on us when we were within two townships of completing the county.

Mr. WASON. Why did you not pursue it there and test the matter?

Mr. NORGORD. We had so many counties in the northern part of the State that had petitioned and that we had agreed to begin work in, that we felt that we could not afford to go into court, or at least we thought it wiser to simply stop where we were and not go into court, but proceed in the northern part of the State. In this first county, Waukesha, we had to do a great deal of educating and a great deal of forcing in order to push through the work, but our experience in the later counties is that we go right along and have no objection whatever.

Mr. MAGEE. How many counties in the State of Wisconsin?

Mr. NORGORD. There are 71 counties.

ATTITUDE OF WISCONSIN ON RESTRICTION OF APPROPRIATION TO AREAS.

Mr. ANDERSON. Just one question to get the position of the association if it has taken any position upon one question. The item in the deficiency bill which was passed December 15, 1920–21, carries a deficiency appropriation of $600,000, with this limitation:

> *Provided further*, That no part of said sum shall be expended for the payment of indemnities to owners of herds hereafter placed under Federal and State supervision, unless such herds are located in circumscribed areas designated and agreed upon by the States and the Federal Government in which to conduct cooperative tuberculosis eradication work.

Is your association in favor of that?

Mr. NORGORD. Our association has not taken action on that. In fact, that has never been brought before our association as a body for them to take action upon, and I think that probably a majority of the members of our association do not know that that limitation on the use of that indemnity fund is in the law.

Mr. ANDERSON. I have received a number of telegrams this morning protesting against this particular provision, and I wanted to get the point of view of the commissioners of agriculture, if I could, in respect to it.

Mr. NORGORD. As yet, we have taken no action on that as an association, and I think, perhaps, the best we could do at the present time is for each commissioner to express his own viewpoint. I believe such a proviso would hinder the work in some States without proving a particular aid in any State.

Mr. ANDERSON. Very well.

Mr. NORGORD. If it please your committee,. in order that several gentlemen who must leave may reach their trains, I will call upon them now and perhaps add to my testimony later. We have with us Commissioner Agee, of New Jersey, who has charge of the livestock work of that State, including this accredited herd work.

SATURDAY, JANUARY 28, 1922.

STATEMENT OF MR. ALVA AGEE, SECRETARY STATE DEPARTMENT OF AGRICULTURE, TRENTON, N. J.

Mr. ANDERSON. You may proceed.

Mr. AGEE. I regret, Mr. Chairman, that the chief of our bureau of animal industry, Dr. J. H. McNeil, is not with us, because he has the data which I should have. I should like to call your attention to the fact that we recognize the need of national economy as much, possibly, as those responsible for expenditures, but the question of protection of our herds and protection of health is so important that from our point of view we can hardly realize the possibility of any limitation placed upon the control of tuberculosis. The Federal department and the States have worked for years to bring our live-stock people to a point where they would be willing to remove this menace to public health and to our dairy industry, and just as we have reached the point where our leaders in the live-stock industry want to clean up we are hampered by lack of funds. Yesterday there came to the office of my United States Senator, Senator Frelinghuysen, a letter from a member of the executive committee of the New Jersey Holstein Breeding Association.

Our State has many noted herds of the Holstein breed, and this gentleman, Judge Dungan, protested strongly against the interruption of the work when we had made such headway that the owners of the cattle wanted tests. My own State, a small State, appropriates $75,000 to match Federal funds, and I reckon it would appropriate more, but our allotment of Federal funds is not sufficient to meet the State appropriation, and if I may repeat, the interests of public health and the interests of our live-stock people are so great that we would like to be compelled to exercise economy along other lines rather than to check this work that is finally under way.

Mr. ANDERSON. I want to ask you one question. Perhaps you can answer it. You say your State appropriation is $75,000. Does that include the sum which the State authorized to be paid for indemnities as well as for the administrative work?

Mr. AGEE. We have an operating fund, but this year $75,000 was held sacred to the payment of indemnities.

Mr. ANDERSON. That $75,000, then, is for the payment of indemnities. What proportion of that amount is used by your State for administrative purposes in this work?

Mr. AGEE. The State appropriation of $75,000 is used for the payment of indemnities alone. The salaries for the nine men engaged in tuberculosis eradication work is paid from a separate sum appropriated for administration. I have sought to present to you the attitude of our live stock people, our appreciation of tuberculosis work, and our desire to clean up more rapidly than the funds from the Federal Government can be secured.

Mr. MAGEE. You say the State appropriates $75,000 for indemnities. What allotment for this current year did you get from the Federal Government?

Mr. AGEE. It is very embarrassing for me to come before you without preparation. I can not give you that amount.

Mr. H. R. **Smith**. I have a statement from your own department and it shows that your State indemnity available for the next fiscal year is $75,000, and that you will need Federal indemnity amounting to $40,000 to match it.

Mr. **Anderson**. Can you give us figures for the current year?

Mr. **Smith**. I can not give it for the current year. This is for the next fiscal year.

Mr. **Agee**. We received $27,500 July 1, 1921, and $10,200 January 1, 1922, making a total of $37,700.

I would like to add, if I may, that with our present information, we are doubtful of the wisdom of limiting these payments to work within areas.

Mr. **Norgord**. The next speaker will be Secretary Rasmussen, of Pennsylvania.

STATEMENT OF MR. FREDERIK RASMUSSEN, SECRETARY OF AGRICULTURE OF PENNSYLVANIA.

Mr. **Anderson**. Give your name and address.

Mr. **Rasmussen**. Fred. Rasmussen, secretary of agriculture of Pennsylvania, Harrisburg, Pa.

There are in the State of Pennsylvania about 855,000 dairy cows. The State has done tuberculosis work since 1892, and this work has progressed to a point where the people in the State believe in it as a practical measure for eradicating tuberculosis and protecting the health of the people and the live-stock industry In the State of Pennsylvania 2,585 herds have been tested under the accredited herd plan, which includes 42,903 cattle. Out of this number about 20,000 cattle are pure-bred cattle. There are on the waiting list 1,200 herds, including about 18,000 cattle, the owners of which have made application and are anxious to have their herds tested.

The State spent in 1921 about $195,000 for indemnity. It was matched by the Federal Government by about $95,000 Out of the last special indemnity appropriation of $600,000 the State of Pennsylvania was allotted $20,000. There has already been expended of this amount $8,000, and the $12,000 left will probably be exhausted by the middle of March. There will be no further indemnity to match the State fund from that time until July 1, which, I believe, is the time that the next Federal appropriation becomes available.

We are asking for indemnity appropriation at this time for the reason that the work of tuberculosis eradication is definitely underway, and to retard the work now would be unfortunate, first, because tuberculosis is a communicable disease and where this disease exists a delay in the eradication will mean more cattle will become affected by the disease. We also ask for indemnity appropriation because there is a great movement in this country in the developing of pure-bred herds of cattle. In the State of Pennsylvania there is a great interest in what we call "bull clubs," where the people join together and purchase cooperatively a pure-bred bull with the hope that in a few years those that do not have pure-bred cattle will introduce them.

We feel very strongly that in a community where pure-bred cattle are to be introduced the herds into which they enter ought to be tested and we ought to start on a clean basis. We also believe in having Federal indemnity become immediately available because practically all the milk of the State of Pennsylvania is sold directly as market milk. There are very few dairy manufacturing interests in the State, and the health department is urging in many of our cities either pasteurization of the milk or tuberculin testing of cattle, and there are in many communities a great many people who are asking to have their herds tested for tuberculosis because they want to sell the milk unpasteurized in the cities, and health departments are hardly justified in making tuberculin testing compulsory until the State and the Federal Government are ready and able to take care of the requests made. It is urgent, therefore, that the $1,000,000 which has been struck from the present indemnity appropriation be restored.

In Pennsylvania the people are opposed absolutely to limiting the Federal indemnity to area work. There are many reasons why area work should not be made compulsory in Pennsylvania.

In the first place, if tuberculosis is ever eradicated in this country, it will be because the owners of cattle will have an absolute belief in the value and importance of tuberculosis-eradication work. In conducting compulsory area work three classes of people must be dealt with. One class will be very anxious to have the testing done and the disease eliminated from their herds. Another class will be more or less indifferent, and a third class which will be absolutely opposed. I do not believe it is economy or good business to force at this time any individual to have tuberculin testing done, because after the test is done and the veterinarian has left the farm the care of the herd is in the hands of the owner 365 days out of the year, and unless he has a particular interest and belief in the work the herd is not likely to remain free from disease. We do not like to see the indemnity fund limited to area work because of the pure breed development and the development of bull clubs, I do not remember the number, but there is in Pennsylvania a large number of bull clubs which have not purchased pure-bred cattle because they are waiting for State and Federal aid in freeing their herds of tuberculosis before purchase of pure-bred cattle is made. Some of these people have waited for over a year. We also feel that the Federal Government is not justified in making compulsory area work until such time as the States have proper legislation to meet it. In the State of Pennsylvania counties could not appropriate money for this work if they wanted to. There must be an enabling act passed by the legislature which gives them permission to appropriate money for such a purpose.

Mr. BUCHANAN. Do you mean that it takes a special act to authorize each county? You have no general act of the State legislature to authorize any county to vote on the question, vote an appropriation, taxes, or anything of that sort?

Mr. RASMUSSEN. It requires a special act.

Mr. BUCHANAN. For each county?

Mr. RASMUSSEN. Yes.

Mr. ANDERSON. And you can not get them?

Mr. RASMUSSEN. Yes.

Mr. BUCHANAN. This appropriation has been going on since 1915, this cooperative work?

Mr. RASMUSSEN. Cooperative work was first started in 1917 in United States and in Pennsylvania in 1918.

Mr. ANDERSON. Your State legislature has not yet passed any one act to authorize any county that sees proper to vote a special tax on this or procure money by taxes or otherwise to meet the Federal appropriation to exterminate this disease?

Mr. RASMUSSEN. The State has furnished all the money to meet the Federal appropriation. There has been no request from any county to do work on that basis.

Mr. ANDERSON. Have you in the State of Pennsylvania a law that you can force a county into cleaning up a district?

Mr. RASMUSSEN. No, sir.

Mr. ANDERSON. Have you any compulsory law that you can confiscate the infected cattle?

Mr. RASMUSSEN. No, sir; but we can quarantine infected cattle.

Mr. ANDERSON. It has all got to be by agreement?

Mr. RASMUSSEN. It will have to be.

PERCENTAGE OF CATTLE IN PENNSYLVANIA INFECTED.

Mr. BUCHANAN. Have you given any study as to the per cent of cattle of those tested that have tuberculosis?

Mr. RASMUSSEN. Yes, we have a record.

Mr. BUCHANAN. What per cent is that?

Mr. RASMUSSEN. Ten per cent.

Mr. BUCHANAN. Ten per cent are infected?

Mr. RASMUSSEN. Yes, sir; that varies considerably in different sections of the State

Mr. BUCHANAN. When you find an animal infected, test it, and find it infected, what do you do with it?

Mr. RASMUSSEN. When we find a herd infected the diseased cattle are quarantined and when slaughtered the indemnity paid by the Federal and State Governments goes to the owner.

Mr. BUCHANAN. Killed immediately?

Mr. RASMUSSEN. Yes, generally.

ATTITUDE OF PENNSYLVANIA ON RESTRICTION OF APPROPRIATION TO AREAS.

Mr. BUCHANAN. Have you made any study as to what percentage of contagion is caused by an infected animal that is not destroyed on other animals?

Mr. RASMUSSEN. I do not understand the question.

Mr. BUCHANAN. Have you made any estimate or has there been any estimate or calculation or study made of the question of how many infections will proceed from one infected animal? How many new infections?

Mr. RASMUSSEN. I do not see how to make a study of this.

Mr. BUCHANAN. They certainly do it in human disease.

Mr. RASMUSSEN. It depends on how many clean susceptible cattle are exposed to the diseased animal.

Mr. **Buchanan**. To illustrate my point, in tuberculosis in people it is estimated that from two to five new infections are caused from an infected person unless they are strictly isolated, in human tuberculosis. Are there any similar figures on cattle having a bearing in these unrestricted districts?

Mr. **Rasmussen**. This may be another way of answering your question, as I understand it. In other words, you wonder whether by a system of testing for individual owners, whether there is more chance for reinfection of these herds which are cleaned up than when working on an area basis?

Mr. **Buchanan**. My question is directed to why you say the Federal money should not be restricted to clean up districts.

Mr. **Rasmussen**. Yes.

Mr. **Buchanan**. Now, then, if it is not restricted to clean up districts but it is general and you do not destroy all the cattle you find infected with tuberculosis, what is the use of destroying some of them and those not destroyed will continue to spread the infection?

Mr. **Rasmussen**. I do not have the figure here, but I can say that in the State of Pennsylvania under the present plan as conducted by the State and Federal authorities the percentage of reinfections is less than the average of the entire country. There was a 1 per cent reinfection in accredited herds in Pennsylvania as compared with an average of all the States of a 2 per cent reinfection in accredited herds from July 1, 1920, to June 30, 1921.

Mr. **Buchanan**. That may be.

Mr. **Rasmussen**. Understand me on one point, please, and that is this, that we do not object to area work in Pennsylvania and we want to practice it just as far as possible, but we do feel that there are many instances and cases where the State and Federal Government would be perfectly justified in paying indemnity to owners of cattle outside of limited areas.

Mr. **Anderson**. For instance, where you are bringing a pure-bred bull into a herd and you know that bull is free from tuberculosis, naturally, the owner of the herd, even if it is not in an unrestricted area, an accredited area, might want his herd tested because he would not want to bring an expensive bull and particularly a bull that was used by a number of people into a herd without knowing that there was no possibility of infecting the bull. There are many conditions, it seems to me, which support the position that you have taken.

Mr. **Wason**. In answering Mr. Buchanan's question about the extent of infection from a diseased animal, whether you have ever made a study of that, every germ that that diseased animal emits. if it comes in contact with another animal, enters the system and then works or becomes active and that animal is infected, is it not?

Mr. **Rasmussen**. An animal can harbor and disseminate tubercle bacilli without having tuberculosis. Such animal is a carrier of tuberculosis bacilli without actually being infected.

Mr. **Wason**. The limit that one animal may spread the disease depends on the number of other cattle that come in contact with the germs that this animal discharges or emits and the germs become active in those animals that come in contact with the infected animal. Is not every animal that has tubercular germs in its system combating the germs by reason of its physical strength, the same as in human beings?

Mr. **Rasmussen**. Yes.

Mr. Norgord. If Mr. Rasmussen will permit, I happen to have an illustration in my mind that would answer that question as one instance.

Mr. Buchanan. I would be glad to have it.

Mr. Norgord. I do not believe there are any average figures showing how rapid the infection proceeds, but I could answer your question by an illustration. We came in contact with one herd where a bull was introduced into the herd and put into a box stall one winter. The bull was not tested or did not, at least, respond to the test. A heifer standing at the upper end of that row of cattle in which there were 35 animals was placed in a box stall adjoining the bull, so that she drank out of a common watering trough between the two stalls. She stayed there while she was calving and after that was put back in her place at the upper end of the row of 35 head of cattle, right by the water spigot which furnished water in the same manger, and the water ran from her to all of the other animals in succession. These 35 animals had been tested each year for a number of years back so that there was every evidence that the animals were free from tuberculosis, but at the time of the next test following the date when this animal calved, which was about six months afterwards, seven months afterwards, 28 out of those 35 animals reacted.

Mr. Buchanan. You mean were infected?

Mr. Norgord. Were infected; yes, sir. That was within a period of six or seven months from the time that the infection apparently came to that animal, and shortly afterwards he died and when there was a post-mortem they found that he was rotten with tuberculosis.

Mr. Buchanan. Have any of you ever considered whether or not there would ever come a time when we have tuberculosis almost or practically eradicated, or would this appropriation have to go on forever?

Mr. Norgord. I think when I come to speak further on Wisconsin I have in mind some figures I can give you.

Mr. Agee. The question, as I understand it, is upon the desirability of area testing and the danger of using public money without effect if we passed an individual herd in an area where other herds are untested. I would like to have you know, Mr. Chairman, that the owner of such a herd uses every endeavor to isolate his cattle. Quite recently we received a complaint from the owner of an accredited herd that a farmer was pasturing some cattle on the border of a stream that passed through his farm and he had reason to believe that those cattle which were pastured were not clean, and his protest was that his cattle should be in danger by any such carelessness. When the owner of a tested herd wants to make an exhibit at a State fair or other fair there is a requirement that all cattle brought to that fair shall be tested as individuals before this man will submit his cattle to proximity to the other cattle, so that you do see that the man who has a tested herd in an untested area has a great measure of protection and that, if a neighbor of his has been compelled to test who did not believe in it, he would have no greater advocate because that man would not employ the measures necessary to keep disease out of his herd.

Mr. Rasmussen. It must be understood that an owner of cattle signs an agreement with the Federal and the State Governments which prescribes a great many items which are intended to safeguard the herd from reinfection.

If all cattle in an infected area are tested and infected animals removed there will in all probability still remain sources of infection in that area, because the tubercle germs are very widely scattered if there has been very much infection.

Although we desire and look forward to area work, at this time it seems this plan should be left optional with the States until such a time that the States can prepare to take up area work in a way that will make it effective. If numerous so-called tuberculosis free areas are established, precautions must be taken and public regulations made and enforced to protect these areas, for unless this is done we can not maintain any greater degree of safety within the area than we can by properly safeguarding the individual herd.

Mr. BUCHANAN. When is your State going to take up the matter of passing drastic regulations so that you can regulate it?

Mr. RASMUSSEN. We expect to. The Legislature in Pennsylvania meets every other year. Legislation of this character can not be passed until the people fully understand its purposes and public sentiment is developed. This is a new thing. There was no preparation given; there was no warning given to the States that the Federal Government planned to make area work compulsory. If there had been, undoubtedly the States would have taken some measures to educate and pass laws to meet the situation.

Mr. BUCHANAN. Has there been any warning yet?

Mr. RASMUSSEN. None. Except the warning in the deficiency appropriation. which made area work practically compulsory.

I thank you for your attention.

SATURDAY, JANUARY 28, 1922.

STATEMENT OF MR. H. R. SMITH, NATIONAL LIVE STOCK EXCHANGE, CHICAGO, ILL.

Mr. SMITH. Mr. Chairman, I would first like to read a statement by Mr. Everett C. Brown, president of the National Live Stock Exchange. He is greatly interested in this subject but found at the last moment that he could not be here and asked me to read this statement.

Mr. ANDERSON. Certainly.

Mr. SMITH (reading):

> As the representative of the National Live Stock Exchange, an association of all the principal live-stock exchanges at the various markets in the United States, I wish to present to your committee a few facts bearing on the tuberculosis situation and to urge the need of adequate appropriations for combating this plague.
>
> In this connection, I wish to state that the live-stock commission men of this country are vitally interested in any movement which contributes to the welfare of the live-stock industry of the Nation. Located as we are at the various market centers where animals are slaughtered for food, we are in a position to observe the large number of cattle and hogs condemned as inedible for food consumption because post-mortem inspection reveals the presence of tuberculosis. While these animals look healthy at the time of sale and are paid for at the market price, it is apparent that the packers are forced to discount the price, anticipating that a certain percentage will not pass inspection. This means that the shippers stand a tremendous loss caused by these condemnations.

We have requested records from the office of the United States Division of Meat Inspection which show that during the fiscal year ending June 30, 1921, a total of 37,702,866 hogs were slaughtered under Federal meat inspection in the United States, of which number 4,693,305, or 12½ per cent, showed lesions of tuberculosis. In the majority of these retained hogs the lesions were confined to the glands of the throat, in which case only the head is condemned. There were, however, a total of 64,830 hogs wholly condemned for tuberculosis and sold for inedible products. In addition to these a total of 96,340 hogs were put through a process of sterilization and sold as such at less than half the usual price.

SOLD AS CANNED MEAT AND LABELED STERILIZED MEAT.

Enough cattle and hogs were wholly condemned for tuberculosis during the present fiscal year to make up 100 trainloads of 30 cars each. These records further show that whereas only 2 per cent of the total kill of hogs in the United States were retained for tuberculosis in 1908, this per cent has increased steadily year by year until during the year ending June 30, 1921, it reached 12½ per cent. While the hogs killed under Federal inspection represents 60 per cent of all the hogs slaughtered, it stands to reason that the remaining 40 per cent killed on farms and in local slaughterhouses are equally affected. This means that on an average one hog out of every eight owned in the United States is affected with tuberculosis.

Those are the exact figures of the Division of Meat Inspection.

The first appropriation made by Congress four years ago for the inauguration of a Nation-wide campaign to control and eventually eradicate this disease came none too soon. It is encouraging to note that while the percentage of cattle retained in the United States for tuberculosis increased from 1 per cent in 1908 to 2.6 per cent in 1916, this percentage is now on the decline, and, according to records received from the United States Division of Meat Inspection, was 2.2 per cent during the fiscal year ending June 30, 1921.

Mr. ANDERSON. In cattle?

Mr. SMITH. In cattle. I wish you would keep those figures in mind. The percentage retained in 1916, when your first congressional appropriation was made in this work covering various States, was 2.6 per cent for the whole United States. Continuing Mr. Brown's statement, I read:

While this campaign is not yet sufficiently expanded to show any decrease in the prevalence of tuberculosis among hogs, it is known to be a fact that when the disease is eliminated from cattle, as it can be done in a few years with proper support from Congress and State legislatures, it will be eliminated automatically in swine, as it has been stated by our best authorities that practically all of the tuberculosis in swine comes from cattle, largely from infected milk, and to some extent also from droppings and the eating of dead carcasses on the farms.

That is, dead from tuberculosis.

Fully realizing the necessity of all doing their part to stop this big leak in the live stock industry, the live-stock exchanges at the principal markets have subscribed liberal funds for the employment of men designated as live-stock commissioners to cooperate with the Federal and State sanitary officials in combatting tuberculosis in live stock. These men are giving their time to the tracing of diseased shipments back to the farms, so that some of the worst centers of infection can be cleaned up. In view of the fact that cattle and hogs do not in most cases show evidence of the disease to the owner, these commissioners are also aiding in the dissemination of information among farmers, so that they will know how to proceed to eliminate the disease from their herds. This can only be done on the farms which supply cattle and hogs to the markets.

Here is a statement Mr. Brown makes that I wish to give emphasis to:

We have kept in close touch with the methods employed by the United States Bureau of Animal Industry and the various State officials in coping with this situation and can say advisedly that the money being expended by the National Government and the various States is being used to the very best advantage and that remarkable progress has been made in the short time this work has been underway.

It is a self-evident fact that tuberculosis can not be eliminated without the expenditure of funds. Because this disease works under cover the farmers whose herds are infected are unaware of its presence unless some of the cattle become emaciated and die from its ravages and even then the majority of the farmers do not know that the cause of the death of these animals is tuberculosis. The disease can only be exterminated by locating the infected animals through the application of the tuberculin test, the slaughter of such animals, the disinfection of premises, and the use of precautionary methods that will keep the disease out in the future. It is apparent to all that the farmers must have help in bearing the losses incident to the slaughter of the cattle which react to the test. The plan inaugurated by Congress whereby the National Government pays one-third of the loss if the State pays one-third and the owner stands one-third of the loss is, I believe, fair to all concerned. The farmers throughout the country are voluntarily placing their herds under supervision for the test and the slaughter of reactors under these conditions. If they were forced to clean up without this aid a large number would be driven into bankruptcy to the great detriment of the country.

I wish to emphasize that statement. I have heard it argued that we should not pay an indemnity to the farmers, and you observe here his statement that if they did not receive help from the Government and the States they would go into bankruptcy. I believe the plan is very practicable.

Mr. Wason. Just to elaborate your point, if you will permit me, I happen to know a man in my vicinity of the country who had not got his farm quite paid for. Within a year and a half he called a veterinarian and every one of his 40 head of cattle reacted, and I happen to know that his salvage was about $10 a head from the slaughter after paying the expense of slaughtering. That is to emphasize your point.

Mr. Smith. Exactly.

Mr. Wason. If it had not been for State and Federal help, he would have been ruined.

Mr. Smith. The same thing happens all over the country. Just one more paragraph:

Progress in the eradication of tuberculosis is limited by the amount of money available for the payment of indemnity. That the States have responded well to the proposition made by the Federal Government to cooperate on a 50-50 basis is shown by the fact that the total funds provided by the various States for indemnity purposes exceeds the funds made available for this purpose by the Federal Government. We deem it a matter of the greatest possible importance that this Congress make provision for the complete fulfillment of its contract with the States in order that this work may go forward at a still more rapid rate to the end that this handicap to the development of our live stock industry and this menace to public health may be eliminated in the very near future.

I wish to say in my own behalf, Mr. Chairman, as live stock commissioner of the National Live Stock Exchange, it is my work to help the Federal and State authorities in carrying on lines of work having to do with the increased production and conservation of animals and necessarily I have kept in touch with the work throughout the Nation rather closely. I took occasion to write to every State official a letter to ask how much money is available in each State for indemnity purposes and how much money will be needed from the Federal Government to match the State appropriation. I wish to read just one of the replies so that you may know how the answers were received:

H. R. Smith,
Union Stock Yards, Chicago, Ill.

Dear Sir: Referring to yours of recent date, I may say that the indemnity fund available for the State of Vermont for the next fiscal year is $145,000. To match this State indemnity fund we shall need $145,000 Federal indemnity for the next fiscal year, beginning July 1, 1922.

Yours, truly,

E. S. Brigham,
Commissioner of Agriculture, State of Vermont.

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State.	State indemnity funds available next fiscal year.	[illegible]	[illegible]	[illegible]
Tennessee	[illegible]		[illegible]	
Texas	2,[illegible]		2,[illegible]	
Utah	[illegible]		[illegible]	
Vermont	[illegible]		[illegible]	
Virginia		[illegible]		[illegible]
Washington	[illegible]		[illegible]	
West Virginia	4,[illegible]		3,[illegible]	
Wisconsin	[illegible]		[illegible]	
Wyoming	[illegible]		[illegible]	
Total	[illegible]	[illegible]	[illegible]	[illegible] [illegible]
Total Federal indemnity required to match State indemnity				[illegible]

Mr. Anderson. Is the use of this money in any of the States contingent upon Federal appropriation?

Mr. Smith. I am not sure. I know that in Illinois it is not, but I think it is the practice in most of the States to pay even though the Federal Government did not pay. I am not sure about it. It may be that some of the State laws provide that money shall be paid only if the Federal indemnity is paid.

Mr. Anderson. Of course, I suppose the State would only pay its proportion.

Mr. Smith. Only pay its proportion.

Mr. Anderson. So that if an animal was slaughtered the owner would only get one-half of the amount which is now contemplated by existing procedure.

Mr. Smith. Yes. For example, in Illinois, the State pays one-third.

The total Federal indemnity that is required to match the State appropriation is $2,484,333. You understand that it does not require quite as much Federal indemnity as State, because a number of States pay a higher indemnity than the Federal Government. The State of New York pays over double what the Federal Government pays in indemnity.

Mr. Magee. Yes, I understand it does.

Mr. Smith. Indiana, Iowa, and Michigan pay more. But these figures I have given you show just the amount of the Federal indemnity that is required to match the State indemnity now available in the various States. I have a report from other States, which shows that they will need $200,000 additional in these States. That is indicated in this report. I want to submit that for your consideration.

Referring to the statement made by Congressman Wason, I wish to give an illustration.

Mr. Anderson. One question: I want to be certain about this proposition. The heading here is "State indemnity funds available next fiscal year." In these States is there a separation of the appropriation made for indemnity purposes and administrative purposes?

Mr. ANDERSON. Does that take into consideration a limitation in the present law upon the amount which can be paid in any event by the Federal Government as its part of the indemnity for the grade animal or the pure-bred animal?

Mr. SMITH. Yes; it does.

Mr. ANDERSON. Let us see about that. If that is true then there must be the same limitation as in the Federal law.

Mr. SMITH. Yes.

Mr. ANDERSON. Is there such a limitation?

Mr. SMITH. Yes, sir; the same limitation in several States as in the Federal law. We have it in Illinois and Nebraska.

STATEMENT SHOWING STATE AND FEDERAL INDEMNITY FUNDS FOR FISCAL YEAR 1923.

I would like to submit to your committee the complete statement from all the States, and I will be very glad to turn over to you all of these that have been received tabulated in this form, as it shows the total State indemnity money available for the next fiscal year, $3,782,500. That money is now available and has been appropriated by all the States of the Union. I say all; there are three that have not yet appropriated funds.

(The statement referred to follows:)

State.	State indemnity funds available next fiscal year.	Probable State indemnity funds to be appropriated for next fiscal year.	Federal indemnity fund needed next fiscal year to meet State funds already available.	Additional Federal indemnity fund needed next year to meet the probable State funds to be appropriated.
Alabama				
Arizona	$15,000		$15,000	
Arkansas				
California				
Colorado	4,000		4,000	
Connecticut	100,000		60,000	
Delaware	50,000		33,333	
Florida	12,000		4,000	
Georgia				
Idaho	10,000		10,000	
Illinois	125,000		125,000	
Indiana	100,000		80,000	
Iowa	250,000		185,000	
Kansas	50,000		20,000	
Kentucky	40,000		18,500	
Louisiana				
Maine	40,600		30,000	
Maryland		$100,000		$100,000
Massachusetts		60,000		60,000
Michigan	400,000		200,000	
Minnesota	100,000		32,000	
Mississippi	10,000		10,000	
Missouri	110,000		110,000	
Montana	70,000		35,000	
Nebraska	100,000		100,000	
Nevada	7,000		5,000	
New Hampshire	75,000		40,000	
New Jersey	75,000		40,000	
New Mexico	5,000		5,000	
New York	1,000,000		450,000	
North Carolina	10,000		10,000	
North Dakota	18,000		18,000	
Ohio	50,000		50,000	
Oklahoma	45,000		25,000	
Oregon	40,000		30,000	
Pennsylvania	180,000		100,000	
Rhode Island	28,000		16,000	
South Carolina	5,000		5,000	
South Dakota	30,000		20,000	

State.	State indemnity funds available next fiscal year.	Probable State indemnity funds to be appropriated for next fiscal year.	Federal indemnity fund needed next fiscal year to meet State funds already available.	Additional Federal indemnity fund needed next year to meet the probable State funds to be appropriated.
Tennessee	$20,000		$10,000	
Texas	20,000		20,000	
Utah	7,500		7,500	
Vermont	145,000		145,000	
Virginia		$50,000		$40,000
Washington	30,000		30,000	
West Virginia	40,000		30,000	
Wisconsin	350,000		350,000	
Wyoming	16,000		16,000	
Total	3,782,500	210,000	2,484,333	200,000 2,484,333
Total Federal indemnity required to match State indemnity				2,684,333

Mr. Anderson. Is the use of this money in any of the States contingent upon Federal appropriation?

Mr. Smith. I am not sure. I know that in Illinois it is not, but I think it is the practice in most of the States to pay, even though the Federal Government did not pay. I am not sure about it. It may be that some of the State laws provide that money shall be paid only if the Federal indemnity is paid.

Mr. Anderson. Of course, I suppose the State would only pay its proportion.

Mr. Smith. Only pay its proportion.

Mr. Anderson. So that if an animal was slaughtered the owner would only get one-half of the amount which is now contemplated by existing procedure.

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Referring to the statement made by Congressman Wason, I wish to give an illustration.

Mr. Anderson. One question: I want to be certain about this proposition. The heading here is "State indemnity funds available next fiscal year." In these States is there a separation of the appropriation made for indemnity purposes and administrative purposes?

Mr. SMITH. Yes, sir; there is no mention made of administrative funds.

Mr. ANDERSON. So that in every one of these cases the figure represents the amount available for indemnity?

Mr. SMITH. Yes, sir.

Mr. ANDERSON. It does not include the sums available for administrative purposes.

CAMPAIGN IN HILLSDALE COUNTY, MICH.

Mr. SMITH. No, sir; none for administrative purposes, just indemnity purposes. That case I was going to mention, Mr. Wason, is this. In our campaign in Hillsdale County, Mich., I learned last Sunday when I was over there that one man lost 11 out of 12 cows in the recent county-wide test. His son, 13 years old, has tuberculosis. Besides what Mr. Norgord said, I want to say this: In the campaign in that county the board of supervisors appropriated $3,500 to hire a veterinarian and pay his expenses. That entitled us to have another veterinarian supplied by the Federal Government under the terms of the agreement. In order to make a demonstration other veterinarians were assembled and a drive was made. They went over that county in two weeks and tested 95 per cent of all the breeding and dairy cattle in the county. They do not test the steers unless the steers are mixed with breeding cattle. The steers must be separated. If they are mixed they must be tested and if the steers react they must be slaughtered, but no indemnity is paid for steers.

We tested in the drive 15,560 cattle and they found 365 reactors, 2.3 per cent. That test was not compulsory. The people wanted it. They appropriated funds to get the work started and it was purely voluntary. Before we finished 95 per cent voluntarily asked to have their herds tested and public opinion is forcing the remainder to test. We expect to have 100 per cent in the county, and our information is that the State commissioner of agriculture has put on a regulation in response to the demand of the people that no cattle shall be allowed to come into that county unless they are tuberculin tested. They have a clean county and expect to keep it clean.

Mr. ANDERSON. How often do you in practice test these herds again once you have got them in an accredited area and they become accredited herds?

Mr. SMITH. The herds that we found to be infected will be tested six months after the first test. The herds that were not infected will not be tested for a year and, possibly, two years.

Mr. ANDERSON. Does that have to go on from year to year indefinitely?

Mr. SMITH. Not every year. They will have to keep watch of it closely to test the herds that are found to be infected. Then we will have a clean area. I do not believe it will be necessary to test every year.

NUMBER OF DAIRY CATTLE IN THE UNITED STATES.

Mr. ANDERSON. How many dairy cattle are there in the country? Something like 25,000,000?

Mr. MOHLER. Twenty-four million.

Mr. ANDERSON. If you eventually have to go to the point of testing these 24,000,000 cattle every year or two, this is going to be an expensive system.

Mr. SMITH. I do not see why it is necessary.

Mr. WASON. Why do you say that it is not necessary to test once a year when you have ascertained that the herd is clean? Do you know that the ravages of this disease when it starts will destroy an animal in a year?

Mr. SMITH. Yes, sir.

Mr. WASON. Or earlier than that?

Mr. SMITH. We will have to continue testing at least once a year those herds that are found infected, but in this county of which I speak not 10 per cent of the herds were found infected.

Mr. ANDERSON. You do not find infected herds until you test them.

Mr. SMITH. That is true. If they have tested all the herds in a county and found them clean, and if you use very careful methods in keeping out infection in the future, I do not believe we are going to get very much more.

Mr. WASON. I do not want to be captious, but let me ask you a question. On the northerly line of Hillsdale County that you are talking about, you are sure that the herds in the county are clean; you are not sure about the county that adjoins that, adjoins it on the north, are you?

Mr. SMITH. No. They are cleaning that up now.

Mr. WASON. How are you going to keep the communication of this disease into Hillsdale County from the other county?

Mr. SMITH. The county north, Jackson County, is going through the same process now, but I say a regulation has been issued by the State commissioner of agriculture which requires that no cattle shall be brought into the county unless they are first tuberculin tested.

Mr. WASON. After you treat Jackson County that way, there is another county, and when you get large areas in this country, for instance, there are live cattle moved from Nebraska to Chicago or from Chicago east and they are taken in trains adjacent to fields or pastures where cattle in clean areas are pastured. Is it not possible that as they go through the infection may spread?

Mr. SMITH. It is possible, but I think the danger would be very slight.

Mr. BUCHANAN. Suppose a stream runs from one county to another.

Mr. SMITH. That is a different proposition.

Mr. MAGEE. There is no question of the proposition that in a disease like tuberculosis you might as well recognize the fact that we have a constant fight and it is a question of how much progress you can make.

Mr. SMITH. That is right.

Mr. MAGEE. But the result of giving it attention is so great that you can not stop the work. You have got to combat it as well as you can and get as many States and as many people interested as you can. That is the way it strikes me.

Mr. SMITH. I might say that it is the intention of our county to continue to appropriate to employ a man in the county.

AVERAGE COST OF TESTING.

Mr. BUCHANAN. What does it cost for the average test?

Mr. SMITH. It depends on conditions. It has been estimated in some States about 25 cents a head; other States as high as $1.

Mr. BUCHANAN. What is the average cost per head per test?

Mr. SMITH. Throughout the country?

Mr. BUCHANAN. Yes.

Mr. SMITH. Around 50 cents.

Mr. NORGORD. Fifty cents for subcutaneous test where you have to take temperatures and 25 cents for intradermal test where no temperatures need be taken.

Mr. BUCHANAN. What would that average? I do not know the proportion of these two tests. What do you consider would be the average per head?

Mr. NORGORD. I would have to make a guess. It would not be accurate.

Mr. BUCHANAN. What proportion of the number that you have to apply these two tests to do they bear to each other?

Mr. NORGORD. The intradermal test is a new test that is making rapid progress in introduction into the various States, and it is hard to say just what proportion is intradermal and just what proportion is subcutaneous.

Mr. BUCHANAN. Does it cost 30 cents on an average?

Mr. NORGORD. Yes.

If I might add a word, the question brought up was the large cost of continuing to pay indemnity and operating funds for testing and paying indemnity in the future. I think that the time ought to come when it would not be necessary to pay indemnity. After a man has cleaned up his herd and received indemnity and perhaps tested a few years more under an indemnity law, where the indemnity, of course, would not be so large, I think the time would come when he should take care of his own herd in indemnity, and probably some arrangement could be made whereby the total cost of testing could be thrown upon the individual. I think the obligation that the public owes to pay indemnity and help to clean up is not so great after the farmer once gets cleaned up, as it is at the present time when farmers have been permitted to go in and develop these herds that are tubercular that in many instances started before the present knowledge of tuberculosis was as far developed as it is now.

Mr. MAGEE. As I look at it, the whole proposition is for the protection of the public; it is not the protection of the owner of the cattle. He may be negligent, new cases may break out in the herd as described here in the case of a heifer that was at the head of a row of cattle and others down the line drank water that flowed by her, and they broke out anew. My idea of making an appropriation is not for the benefit of the owner of the cattle, but it is for the benefit of the public or protection of the public against the scourge of tuberculosis.

Mr. BUCHANAN. Ultimately, do you not think it would be possible to arrive at that stage where the States could take care of the whole thing or the remaining part of the work and not call upon the Federal Government for anything?

Mr. SMITH. Ultimately?

Mr. BUCHANAN. Yes. Is not the primary object of the Federal appropriation to share with the States, to stimulate the activity or emphasize the necessity for this work, and after the interest gets sufficiently aroused that the State Government or people should take care of all of it?

Mr. SMITH. I think ultimately that might be possible.

Mr. **Buchanan**. Do not all of you gentlemen realize that a Federal appropriation in cooperation with States is not economy in one sense of the word? It is simply sending the State funds or taxes that the States have paid to the Federal Government, sent back with a double overhead charged by the Government to follow their own appropriation?

Mr. **Smith**. Yes, sir.

Mr. **Buchanan**. It is not an economical system at all.

Mr. **Smith**. I would say that we would not have made the great progress we have made without centralization of the work. It has been a most efficient arrangement. We have to-day a unified system.

Mr. **Buchanan**. That is very true.

Mr. **Smith**. I believe eventually that can be done.

Mr. **Buchanan**. The Federal appropriation centralizes or unifies this under one head and has uniform rules and the best methods. Then after it stimulates interest in the people and the different States have like the Federal Government made an appropriation, the States could then make appropriations to take care of it all, because they must realize that a double appropriation by the Government and the State with each following up its own appropriation involves double overhead expense and is not an economic thing to do.

Mr. **Smith**. I think eventually that is true. Unless there is something else, I will now introduce Mr. Halliday, who wants to get an early train. He is commissioner of agriculture of Michigan.

Mr. **Anderson**. We will hear Mr. Halliday.

STATEMENT OF MR. H. H. HALLADAY, COMMISSIONER OF AGRICULTURE OF MICHIGAN, LANSING, MICH.

Mr. **Halladay**. A great deal of ground has been covered that I might talk about, but I will not take your time. I might say I have been in this animal-disease control work for 11 years and have seen it in its infancy up to the present time and am amazed at the progress that has been made in the last two years. I think that progress is due largely to the interest which the Federal Government has taken in this work. The educational feature of the accredited herd work have been far-reaching in its effect. It has taught the owner of the pure-bred cattle that he must have clean cattle in order that he may sell them to advantage. It has also appealed to the people as a human health problem, and to-day in Michigan that part of the work appeals to the people of the State more than any other. I might say to you here that if it was only for the purpose of saving cattle I would not ask from the State of Michigan the appropriation of $1 of funds, but it is a human health problem, and nearly every city in the State of Michigan has enacted ordinances compelling the tuberculin test of herds before milk can be sold within their municipalities.

Mr. **Anderson**. Do not your municipalities require pasteurization generally?

Mr. **Halliday**. Some of them do; Detroit, the largest city of the State, requires pasteurization. But the health officials of the State believe that pasteurization is not sufficient, that it has been demonstrated, I think, by Dr. Mohler's department—or, at least, some public-health department of the National Government—that pasteurization does not kill the tuberculosis bacillus.

Mr. **Anderson**. Has it not also been demonstrated that pasteurization really takes something from the nutrition value of the milk?

Mr. **Smith**. Some of the vitamines.

Mr. **Halliday**. It has been argued that it destroys some of the bacteria that are necessary to the proper digestion of milk. As I was saying, the city of Detroit now feels that it is necessary to enact a tuberculin-test ordinance, and it will be enacted in the very near future for the county of Wayne, which has a board of supervisors composed largely of city supervisors. They have made an appropriation, without the solicitation of the State or of the Federal Government, of $5,000, to hire a veterinarian to assist in the cleaning up of the tuberculosis in that county.

We now have 10 counties in the State which are asking for this work and which have made appropriations by boards of supervisors. The work in our State is progressing faster than we can take care of. Of course, they expect Federal indemnity and that has lent considerable encouragement to this work, and all these different agencies have assisted in teaching the people that this is a health work and that part of it appeals to the people in the city as well as in the country. I feel that in the State of Michigan we will not be handicapped by the lack of funds. We had a reorganization of our State government, and in that reorganization there was passed a law creating what is known as the State administrative board, and the legislature only appropriated $100,000 for indemnity for tubercular cattle during the last year, and last week those indemnities were used up. I went before the administrative board and they assure me that the funds will be forthcoming to any extent that would be matched by the Federal Government, so there is no limitation so far as we are concerned. We are going ahead to clean up the disease as fast as we can, because we believe it is economy.

I believe that there is a responsibility upon the live-stock owner, and I think we have got to stress that point, and in our work in the different States we have got to educate those men that some day this responsibility will be upon them in keeping their herds clean, and we are emphasizing it in the counties in which this work is being carried on, that, perhaps, some day they will have to provide their own means of testing and supervising the work instead of always being done by the State and Federal Governments.

Mr. **Magee**. Suppose he does not test. Suppose you test his herd and you let him go and then he does not make any test at all? What are you going to do with him?

Mr. **Halliday**. In my State, if I think it necessary I would place his herd under quarantine and not permit him to sell his cattle.

Mr. **Magee**. That is the impression of what I get from you. I agree with you absolutely that we ought to put the responsibility upon him. I had the impression that you let him go.

Mr. **Hallliday**. No, sir; I would not let him go.

Mr. **Magee**. It seems to me that is the point, that in this work there is an obligation if the herd is once cleaned up to see that it stays clean.

Mr. HALLIDAY. That is why I said that I believe it should be supervised by the State and Federal Governments. I believe that it will be necessary to have the supervision under the State and Federal Governments.

Mr. MAGEE. In other words, good work would be of no account unless it was kept track of and followed up.

Mr. HALLIDAY. I agree with you absolutely, and the laws of my State are such that we can do that. The commissioner of agriculture has unlimited power along those lines. Mr. Smith has said that the county of Hillsdale passed the quarantine regulation that no cattle shall be brought in, and the same applies to the State as it applies to all the other States.

Mr. MAGEE. It seems to me it is a situation where too much vigilance can not be exercised.

INCREASED SALE VALUE OF CLEAN CATTLE.

Mr. BUCHANAN. If the herds had been cleaned or the county cleaned and supposed to be free from tuberculosis, and people owing those herds would want to sell certain of those cattle in a market, would there be any difierence in price of those cattle and the price of a similar bunch of cattle from another county?

Mr. HALLIDAY. Mr. Smith can answer that question better than I can.

Mr. SMITH. I can say that in counties that have been cleaned up it has added materially to the value of the cattle.

Mr. BUCHANAN. In the price of the cattle?

Mr. SMITH. Yes, sir; as high as $25 a head.

Mr. HALLIDAY. He was speaking of the meat value.

Mr. BUCHANAN. Yes.

Mr. SMITH. Upon the meat value, I had occasion to talk with the head of the pork department of Armour & Co. not long ago on that subject and I said, Mr. Waddell, we realize that when hogs come from a badly infected county, that you people are slow about bidding on them and when you do bid you anticipate that a certain high percentage will be loss." He said, "we are compelled to do that." I said, "Would it be true, the opposite be true, that if you knew these hogs came from a clean county, would it make any difference in your bidding." He said, "certainly, we would bid stronger if we knew they came from a clean district."

Mr. BUCHANAN. You mean a higher price?

Mr. SMITH. Yes, sir.

Mr. BUCHANAN. Do you know what the difference in the price would be?

Mr. SMITH. Ten cents a hundred.

Mr. BUCHANAN. That is what he said?

Mr. SMITH. About 10 cents a hundred. The loss from tuberculosis at the Chicago market is costing the shippers to that market about 10 cents a hundred at the present time. That is the cattle shipper. You understand there is no reduction made but I figure it this way. Indianapolis, for example, has a much lower percentage of contamination, about half as much as Chicago. St. Louis is the same.

Mr. MAGEE. In hogs?

Mr. SMITH. In hogs. I understand that practically every week Indianapolis and St. Louis hogs outsell Chicago hogs 10, 15, and even 20 cents. They tell me it is because their losses run so heavy on that market.

Mr. BUCHANAN. On account of tuberculosis?

Mr. SMITH. Yes. Therefore, the shippers on the Chicago market pay that 10 cents a hundred difference.

Mr. BUCHANAN. If the people of the county or State could be impressed with or have that demonstrated to them they would not hesitate to submit to the test of their cattle.

Mr. SMITH. I think the question of human health makes a strong appeal. That is my observation.

Mr. NORGORD. I might add on the subject of increase of value due to tuberculin test that the demand for dairy cattle in Barron County, the first county that we cleaned up, has been tremendous since that county was cleaned up, and the people recognize the greater demand and the greater value that can be obtained for dairy cattle in Barron County, so that we hear quite frequently that some owner of a herd tested in Barron County sells it in Barron County, and cattle sold in that county sells higher.

Mr. HALLIDAY. I think that is true everywhere. There is no State in the Union anywhere that they will accept cattle without the tuberculin test. In coming into our State for cattle they always come to our department to find out where the clean areas are and want to know who tested them and how they were tested and whether they were guaranteed or not, and those cattle bring a great deal more than they would if they were not guaranteed.

Mr. BUCHANAN. Mr. Smith, you do not happen to know anything about the difference in the value of cattle at St. Louis from Texas, on account of the fact that Texas is so far behind in appropriations to match Federal appropriations?

Mr. SMITH. Texas does not have as high a percentage of the disease.

Mr. ANDERSON. Is it not generally true that in Southern States, where the cattle are less confined as a rule, they have a smaller percentage, normally, of tuberculosis?

Mr. SMITH. They have a smaller percentage and it is due in part to the fact that they are less closely confined, but I think more particularly because the South has not been receiving so many of these imported cattle.

Mr. BUCHANAN. It is a matter of climatic conditions to some extent.

Mr. SMITH. They have had Texas fever the last few years, and not many pure-bred cattle have been sent down to that country. The disease is carried by pure breds imported, because we have a high percentage in these cattle.

Mr. NORGORD. I might add another statement. It is well known to all that milk from tuberculosis clean areas is selling at the present time from 5 to 10 cents a gallon higher than that which comes from other sections that are not tested. When we cleaned up in 1919 Washington Island, just north of Green Bay, the creamery in that island put a special label on their butter that it came from none but tuberculin-tested cattle, and the first six months after they got cleaned up and put on their label they got an average of 3 cents a pound more for their butter than before.

Mr. BUCHANAN. That carries out the idea in my mind, to see what the practical results of the theory of testing were, measured in dollars and cents, which appeals to human nature about as strongly as any other element.

Mr. **Halliday**. There is one thing more, and that is this: We believe that when the people are educated and interested in this work we should go on to the limit, and some of the States are not ready for the area work yet. In some way I believe it should be left optional with them whether they take up this area work or whether they take it up under the other plan. In Michigan we are pretty well ready for the area work, but in some of the other States, perhaps, they are not. We should go on just as fast as we can. We are going to have clean States as clean as they can be. We recognize the fact that it may not be during our time when it will be completely eradicated, but we believe that we can so completely clean out these disease areas that it will be a great benefit to human health as well as an added investment and added value of the cattle of the States.

STATEMENT OF MR. L. J. TABER, COMMISSIONER OF AGRICULTURE OF OHIO, COLUMBUS, OHIO.

Mr. **Norgord**. Let me introduce Commissioner Taber of Ohio.

Mr. **Anderson**. We will be very glad to hear him.

Mr. **Taber**. I will take just a moment of your time. I want to emphasize one feature that has been brought out by the questions of the committee. I do think that the period is ahead when we can look forward to reduced expense of operation. We are acting under regular methods of joint cooperation of the State and Federal Government, but we have formulated our plans for turning back the expense of all accredited herds after accreditation entirely upon the owner. We still maintain absolute authority over the herd. They still must test and their certificates must be renewed. But the expense of the test and the losses will be borne by the herd owner.

In the past six months we have tested 19,000 cattle in the State against 11,000 in the same period last year. We have changed our compensation rules, and are making our money go farther. A year ago the average for pure breds was $121 per animal condemned; this year it was $64 per animal condemned. The cost has been less and the overhead expenses less. We were going ahead at high speed when our funds became apparently exhausted. We went to the control board and were assured that $50,000 or $60,000 of additional funds would be available if it could be matched by the Federal Government. We have been assigned only $17,000, which hardly matches our share, but we will accept that and go ahead.

Mr. **Magee**. Of that deficiency appropriation?

Mr. **Taber**. I think it is $17,000 of the total. Ohio believes in area work, but is not yet fully ready for it. We will need legislation making it necessary for the county to participate. We believe this to be a very wise expenditure of both State and Federal funds. We disagree with those who believe that the Federal Government should withdraw. We believe that the supervision of the Federal Government, its national regulation, its national methods of control, are absolutely essential to the control and the ultimate eradication of the disease.

Allow me to say that I am much more concerned about protecting the public health than I am in getting money for the live-stock owner. I have seen farmers practically bankrupt by having the best cattle of their herds destroyed, yet in the interests of the public health we ask for State and Federal funds. Ohio contributes about $45,000 to $50,000 for salaries and maintenance.

Mr. **Magee.** What is the relation of your operating expenses to the aggregate amount paid in indemnities?

Mr. **Taber.** Last year we had about $50,000 for operation and the expenses of the State indemnity were something near $150,000.

Mr. **Magee.** Two to one.

Mr. **Taber.** This year we have been operating a little more economically in Ohio. It will cost about 10 per cent less for the administration than the previous year.

Mr. **Magee.** You paid nearly $150,000 indemnities and your operating expenses were $50,000. That is about 40 per cent.

Mr. **Taber.** That is roughly based on the first half year of our work.

Mr. **Magee.** You would have, then, so much more to pay any indemnities.

Mr. **Taber.** Yes; the control board has promised our department that any saving we might make in appropriations for live stock may be added to our tuberculosis fund.

Mr. **Magee.** For indemnity payments?

Mr. **Taber.** For indemnity payments. Ohio believes in the work and it believes in the wisdom of our plan. We believe in accredited areas, but we are not yet ready for it until we can have State legislation. We earnestly urge that your committee recommend the appropriation of at least $2,300,000 to match State funds for the coming year. We believe it will be an expenditure that will be profitable from an economic standpoint and one that will be invaluable from the standpoint of the health and happiness of the Nation. The fight against tuberculosis in cattle must continue, and the cooperation of the Nation with the State is invaluable.

STATEMENT OF MR. H. E. BABCOCK, REPRESENTING FARM ORGANIZATIONS, STATE OF NEW YORK.

Mr. **Babcock.** Mr. Chairman and gentlemen, I will make a very brief statement. I was asked to come down here by the New York State Grange, the Dairymen's League, the Federation of Farm Bureau Associations, and other farm organizations, to go over the indemnity situation with you. We believe in the Federal accredited herd work primarily because it gives a standard system and puts the weight of Federal authority back of the supervision of the herds. It is stimulating at the present time for the State and the Federal Government to participate in the work, stimulating and hastening it.

and, of course, in a situation where tuberculosis is spreading rapidly it is desirable to have it stimulated. We believe that area work should be optional. We believe that the testing should be done only as rapidly as owners are willing to sign the accredited herd agreement.

I have about 200 head of cattle myself and three different herds under the accredited system, and I am convinced from practical experience that the essential thing is the cooperation of the owner of the cattle with the State and Federal authorities in eliminating disease. New York State is committed to a policy of appropriating $100,000 a month for indemnities, and we expect that indemnity will be available from July 1 on at that rate. Instead of making these appropriations in advance, the system in our case is to allow the claims to accumulate a year and then pay them.

Mr. MAGEE. Do you remember what appropriation was made for the current year?

Mr. BABCOCK. I think $200,000 was made in advance. The present bill is for $1,344,387.61, with $400,000 additional that will likely be introduced before the legislature adjourns, making a total appropriation this past year of about $2,000,000.

Mr. ANDERSON. Does that include indemnity and administrative expenses?

Mr. BABCOCK. No; that is entirely indemnity. In our States owners pay for a great deal of the testing, and I am convinced that owners are going to be willing to pay for it in the future. There is no advantage in getting a herd cleaned up unless the owner has an interest in it. He should be willing to pay the expenses of the annual test, or twice a year, if necessary. I buy a great many cattle myself, and I discount cattle according to the percentage of reactors in the section. If we buy cattle that are 50 per cent tubercular, we buy those cows for about half what we would if we thought they were clean. There are other sections where we know they will not run over 10 per cent, and we figure accordingly in buying pure-bred and grade dairy cattle.

Mr. ANDERSON. Pure-bred cattle.

Mr. SMITH. Pure-bred and dairy cattle. The important thing is this: The Federal Government participated in this in order to give a standardized system which would take care of the interstate shipments, so that when I buy a carload of cattle I know they have been tested according to the system which I believe is correct. At the present time it acts as a stimulant, because it is something that appeals to them; they will work to have it adopted, and they will work harder to get their herds clean. I am not worried about the ultimate cost of indemnities, because after the herd is clean, if the owner is the type of owner who wants a clean herd, he is going to keep it that way and be willing to pay the cost.

New York is the only State I did not get word from. But I went to the records of the bureau and put in $250,000 based on the amount of a year ago. I have heard from all the others.

I just want to say one other thing and then close my statement. The point I wish to make is this: We realize, of course, that there is a tremendous demand for money to run the Government, but we would like to call attention to this fact, that here we have a burning fire destroying property valued at $40,000,000 each year, in this country. Not only that, but it is destroying children to the number of about 800 a year.

I want to explain that statement. I have here a statement made by Dr. W. A. Evans, of Chicago, Ill., former health commissioner. He says:

> There were 1,096,436 deaths from all causes in the registration area in 1919. Of these, the total number of deaths from all tuberculosis was 106,985, and the total number of deaths of children under 5 from all tuberculosis was 5,830. The estimate of Park is that in 1919, 583 children under 5 years of age died of tuberculosis due to bovine tubercle bacilli in the registration area.

Mr. **Anderson**. What is the registration area?

Mr. **Smith**. That is the area where they have records. Dr. Evans told me that that represented about 82 per cent of the whole country. These figures show that 583 children under 5 years of age died of tuberculosis due to the bovine tubercle bacilli in the registration area. This is an estimate only of the deaths due to tuberculosis in children under 5 .

Dr. Evans also says, "The theory of Von Behring as to the cause of tuberculosis in adults is now decidedly in the ascendant." It is that much if not most of the clinical tuberculosis of adult life is the result of infection which has lain dormant for more than a decade and developed into a clinical disease by some period of stress, perhaps in mature life.

Here is what Dr. Park says in his Practical Hygiene, 1913:

> In 25 per cent of all human tuberculosis in children under 5 years of age and in over 40 per cent of abdominal and joint tuberculosis during this age period, the bovine species of germ is present.

Dr. Park in his Practical Hygiene, 1920, says:

> A careful study of all the factors leads us to estimate that about 10 per cent of all the deaths caused by tuberculosis in children under 5 years of age is due to infection through drinking raw cow's milk.

I want to call attention to the case of a family in Illinois, which I had occasion to observe, where five out of seven of them had contracted bovine tuberculosis. One child came down with the disease and had a high temperature. They called a physician, and he pronounced it tuberculosis. A little while later another child came down, and then the physician suggested that the father have the cow's milk tested, and the cow was branded with a "T" on her jaw. It seems that the cow was tested and she reacted, and the owner of the cow said that the cow had been tested. He owed his hired man $120, and he told his hired man he could have the cow in lieu of the debt. So the hired man took the cow, and the result was that five out of seven of the children came down with tuberculosis. One of them had an enlarged throat. Two of the children had sores on their backs, and two of them had sores on their heads. I saw the cow killed, and she was filled with tuberculosis, on her liver, lungs, and udder. Those children are now under the care of a trained nurse and they are gradually gaining strength.

There is only one thing more I want to say. Last Sunday I was in Hillsdale, Mich., and I was told of a case where they had 12 tested cattle which had reacted, and that was the herd of a Mr. Moore, who lives east of Hillsdale. We know that the pig was exposed and had tuberculosis, and the family cat was also exposed and had tuberculosis. I know that in the report of the commission in England it is stated that human tuberculosis is not transmitted to cats. If that is true then the cat in the case I mentioned just now must have gotten it from the milk. There are a good many of those cases.

So, here we have a burning fire, destroying property and life. Can we not cut off expense somewhere else?

Mr. NORGORD. Mr. Chairman, the area method of eradication of tuberculosis which the bureaus of animal industry in the various States are recommending as the most promising method of eradication has been carried on in the State of Wisconsin since 1918, and we have three counties which have been completely cleaned up there now, and in one county all but two townships have been cleaned up. We are operating now in six additional counties, and four additional counties have already sent in their petitions.

Practically all of the northwestern end of the State is working toward petitions, and if that work continues as well as it has gone during the last year at the end of two years, or three years at the most, we will be able to draw a line from St. Paul on the west to Green Bay on the east, and all of the territory north of that line will be cleaned up by the area method.

Mr. BUCHANAN. What proportion of the State will that be?

Mr. NORGORD. That will probably be between one-third and one-fourth of the State. The important question is, what are the prospects for keeping this clean?

As to our method of keeping this clean, I want to submit this little pamphlet for the inspection of the subcommittee. It gives the regulations adopted by the live stock sanitary board of the State department of agriculture, and it also contains on page 13 a statement of chapter 167 of the Laws of Wisconsin, which is the Wisconsin law that authorizes the compulsory method of area test eradication. This also contains a map of the present counties which have been cleaned up and those in which the work is under way.

This regulation has been in force somewhat over a year and we find that the people in the counties are very eager to carry out the full intent of the regulations.

We called a meeting in Darien, in the first clean county, about six months ago, to consider our policy with reference to the admission of feeders, and we told the people they could follow the same rule with reference to taking feeders across their county line as the United States Bureau of Animal Industry followed with reference to the State line. But they were so eager to hold to a high standard that they demanded that all of the feeders that crossed the county line should be tested before they were admitted. And our experience has convinced us that we will be able to keep the territory clean after applying the regulations.

This regulation provides that no cattle can be shipped into a county unless they have been tested, and no animal can be moved from a herd that has tuberculosis to another herd, without a special permit.

Mr. BUCHANAN. Is there any Federal law or effective regulation on this subject? Suppose in this clean district you speak, of some person should purchase an animal from another State. That would make it interstate commerce, and the State regulation would have no control over it. Is there any Federal legislation which supplements the State legislation on that?

Mr. NORGORD. No, sir; the only Federal regulation on that subject would be a Federal regulation which provides that no animal can cross a State line unless it has been tested and is accompanied by a certificate of health.

Mr. BUCHANAN. That is the Federal law?

Mr. NORGORD. That is the Federal law.

Mr. BUCHANAN. That would supplement your State law, would it not?

Mr. NORGORD. That would supplement our regulations. With reference to the cost of handling this accredited herd work and area test work in the future, I want to call your attention to the fact that the regulations of the Bureau of Animal Industry provide that when a herd has been placed upon the accredited list once, neither the State nor the Federal Government pays for the testing after that, but the herd is turned over to the owner and he must take care of it after that.

Mr. ANDERSON. Does he agree to take care of it?

Mr. NORGORD. He agrees to that as a part of the regulations.

Mr. ANDERSON. Does he agree to have them tested at any particular intervals?

Mr. NORGORD. He agrees to have them tested once a year.

Mr. ANDERSON. Suppose, from that test, he finds a reactor. Does the State or the Federal Government pay any indemnity in that case?

Mr. NORGORD. Yes, sir; the indemnity would be paid on the same plan as when the herd is first tested. In addition to the promise that the owner of the herd must make in regard to testing his herd every year, when he signs the accredited herd agreement, if the herd is in a clean county, we will tell the owner to test the herd at least every two years, because we consider that in a case where a herd has not shown any reactors, for the present at least, that herd can be tested every two years and kept clean. We will compel that test, so that we will not have to depend upon the owner's promise for the test every year at any rate.

The State of Wisconsin for this year has an indemnity fund of $350,000 and a similar amount for next year. In 1919 and 1920 we had a total of $353,000.

RELATION OF ADMINISTRATIVE EXPENSES AND INDEMNITY PAYMENTS.

Mr. MAGEE. What is the relation of your administrative expenses to the indemnity payment?

Mr. NORGORD. You mean the operating expenses?

Mr. MAGEE. Yes.

Mr. NORGORD. The State of Wisconsin has appropriated annually $50,000 for operating expenses of the area tests, and $30,000 annually for operating expenses with the accredited herd tests. Then we have $20,000 for operating expenses for tuberculosis in addition, which will be applied to both of those tests.

Mr. MAGEE. I notice here that in the Federal appropriation the amount appropriated is about equally divided between administration and the payment of indemnities. Have you any remarks to make on that proposition?

Mr. NORGORD. I know that in past years the work has been held up because the indemnity fund has usually run out or been depleted before the operating fund.

Mr. **Anderson.** Does the Federal Government work on the 50-50 basis, so far as the administration goes?

Mr. **Norgord.** Yes, sir.

Mr. **Anderson.** So, where you put in a man the Federal Government puts in a man?

Mr. **Norgord.** Yes, sir; they do that for both indemnity and the administration. I have some other figures here which are included in the figures that Mr. Smith gave you.

Mr. **Magee.** I asked the question because some complaint has been made to me that the amount appropriated for administration is too much, compared with the amount appropriated by the Federal Government for the payment of indemnities.

Mr. **Norgord.** I think Mr. Smith can answer that question more accurately, with reference to the whole country. But the statement I made was based on experience of two years, and also during this past year, because an emergency appropriation was necessary to cover the overrun of the indemnity.

Mr. **Magee.** The emergency appropriation was for the payment of the indemnities, was it not?

Mr. **Norgord.** Yes, sir.

Mr. **Magee.** And not for administration?

Mr. **Norgord.** I think that was it.

Mr. **Smith.** It stands this way this year with the emergency appropriation: $1,600,000 for indemnities and $1,000,000 for operating expenses.

Mr. **Magee.** What I want to know is this, if you can tell me—and I am only asking these questions for information—whether you gentlemen have any complaints because of the fact that in the estimate for the next fiscal year about 50 per cent is proposed to be appropriated for administration and operating expenses, and about 50 per cent for the payment of indemnities, or $977,600 for administrative and operating expenses, and $1,000,000 for the payment of indemnities? Do you think the amount estimated for administration is, proportionately, too much, compared with the amount proposed to be appropriated for indemnities?

Mr. **Smith.** Yes, sir.

Mr. **Magee.** I would like to hear your views on that proposition.

Mr. **Smith.** The Secretary of Agriculture requested an appropriation of $2,000,000 for indemnities next year.

Mr. **Magee.** No; he has not done that.

Mr. **Smith.** My understanding was that the increase requested was eliminated by the Director of the Budget.

Mr. **Anderson.** We are dealing here with the Bureau of the Budget and what they estimated, and not with what the Secretary of Agriculture sent to the Director of the Budget.

Mr. **Magee.** If you will look on page 28 of the committee print of the bill you will find an estimate for $1,977,600. You will find the separation of those items on page 26—that is—the separation of the aggregate amount—giving the proposed amount for administration and operating expenses and the amount proposed to be appropriated for the payment of indemnities.

Mr. **Anderson.** The department estimate sent to the Bureau of the Budget was an estimate of $2,000,000 for payment of indemnities and $987,000 for expenses of administration. The Budget Bureau, evidently without much appreciation of the relation between the two, reduced the estimate to $977,600 for operating expenses and $1,000,000 for the payment of indemnities.

Mr. SMITH. I will say now that with the larger use of what is called the intradermal test they can test many more cattle than under the subcutaneous test, which does not require as much for the payment of indemnity.

Mr. MAGEE. I appreciate that. But you gentlemen are likely to get away from Washington to-day, as I understand it, and I would like to have your views on that subject before you leave.

Mr. BABCOCK. I believe it is a safe observation that where the owner pays something for the test he is a good deal more apt to live up to it; he appreciates it more.

Mr. MAGEE. In other words, on the face of the proposed appropriation it would seem as if the amount estimated for administration and operating expenses is very large as compared with the amount estimated for the payment of indemnities.

Mr. SMITH. It is, absolutely.

Mr. MAGEE. I wish you would explain that and give us your views on it while you are here, and if you have any suggestions to make, as far as I personally am concerned, having received a number of complaints myself, I would like to have your views on that question.

Mr. SMITH. We feel that we should not reduce the amount for the administration and operating expenses and handicap the work. We believe with an operating fund of $1,000,000 we can easily take care of a $2,000,000 indemnity fund.

Mr. MAGEE. That is a proportion of 1 to 2. Suppose you had an appropriation of $1,000,000 for the payment of indemnities; would you say you should reduce the fund for operating expenses to $500,000?

Mr. NORGORD. We would have to stop in the middle of the year.

Mr. ANDERSON. In the States what is the relation between administrative and operating expenses and the indemnity fund?

Mr. NORGORD. I can give you the figures for our State, but that covers the subcutaneous tests in part, as well as the intradermal tests.

Mr. ANDERSON. I want to know how much money you spend on your testing; I want to know what you spend for administration and what you spend for the payment of indemnities.

Mr. NORGORD. We will spend this year $100,000 for administration and $350,000 for indemnities.

Mr. ANDERSON. Mr. Babcock, can you give us the same information for your State?

Mr. BABCOCK. I can not give you the exact figures, but the proportion of supervision is, I should say, as a guess, 1 to 5, or something like that.

Mr. ANDERSON. But in your State the owners pay a part of the expense?

Mr. BABCOCK. We have been operating on the basis of the owner paying for the tests, but I think there is a regulation in effect now that the owner can not pay a fee. That is a Federal regulation.

Mr. BUCHANAN. You say that is a Federal regulation, that the owner can not pay a fee?

Mr. BABCOCK. I think so. Under this accredited-herd plan, they test the herds free.

Mr. MAGEE. Did you say the proportion is 1 to 5?

Mr. **Babcock**. I have not the exact figures, but that is nearer to it than the proportion of 1 to 2.

Mr. **Anderson**. Let me ask you this question: Those figures are based upon the fact in part that a part of the cost of the test is paid by the owners?

Mr. **Babcock**. Yes.

Mr. **Anderson**. And as I understand you, in the future, so far as the accredited-herds plan is concerned, the owners will not be permitted to pay any part.

Mr. **Babcock**. I understand that the Federal regulation in effect under the area plan provides that the testing will be done free. As I recall it, the accredited herd agreement is to the effect that the testing will be done free, but it has never been lived up to in our State. The owner has paid for it, and, according to my observation, willingly.

Mr. **Smith**. I think that must be a mistake. It is not true in Iowa or Indiana.

Mr. **Anderson**. Where the owner pays for the test, does he have to employ veterinarians approved by the State or Federal administration, or can he employ anybody he wants to employ?

Mr. **Babcock**. They have to be approved.

Mr. **Norgord**. If they are to remain on the accredited list they must be approved by a regular man.

Mr. **Babcock**. The final test must be made by a man who is on a straight Federal or State salary.

Mr. **Magee**. What I have in mind is this: Those who are interested in the eradication of tubercular cattle came before the Committee on Appropriations, I think last April, and got a deficiency appropriation of $405,000 to continue until the 1st of July, or the end of the fiscal year 1922. In October when I was home they came to me and said that all the moneys which had been appropriated for the payment of indemnities had been practically used. That was in October, or within four months of the beginning of the present fiscal year, and they must have another deficiency appropriation before the close of the fiscal year.

So far as I personally am concerned—and I think my colleagues feel the same way about it—we do not like deficiency appropriations. It was hard to understand, when we gave the appropriation recommended by the Secretary of Agriculture, why they should come back within four months for another deficiency appropriation. In the proposed appropriation for the next fiscal year, if you look on page 26 of the committee print of the bill you will find that there is an estimate of $977,600 for administrative and operating expenses, and $1,000,000 for the payment of indemnities.

That is the aggregate amount submitted to Congress by the Director of the Budget, and it might be that members will hesitate about making a larger appropriation than has been recommended by the Director of the Budget. I think up to date there has been only one instance where that was done, and that was a small appropriation of about $6,000 for the paving of a street which was in very bad shape. Now, suppose that view should be taken, and we should follow this recommendation of appropriating 50 per cent of the total amount for administrative and operating expenses, with a maximum of $1,000,000 for indemnities.

I would like to have your views on that proposition. We are looking for information and have no criticism or complaint to make. But I would like to have your views on that proposition, if the members of the committee or the House should hesitate about making a larger appropriation or increasing to the extent of a million dollars the appropriation recommended by the Director of the Budget, what your views are as to the proportion which should be appropriated for each purpose, confining your views to the aggregate amount recommended by the Director of the Budget.

Mr. BABCOCK. We have been over that situation quite thoroughly in the meeting of the joint farm organizations in New York State. We have reached the conclusion, which I am authorized to state, that a sufficient amount should be appropriated for the Bureau of Animal Industry to maintain an efficient system of supervision for this work. That is up to them to figure out.

Mr. MAGEE. I want to get your views in reference to the concrete figures which are before us as submitted by the Director of the Budget. He has submitted these figures, and I wish you would take these concrete figures on page 26.

Mr. BABCOCK. That is what I have in mind. If $1,000,000 is needed for the system, we want the system perhaps more than we want the indemnities. But we do not want in New York State to spend money in building up a system the expense of which is going to constantly increase.

Mr. MAGEE. So far as the Federal Government is concerned, you think the administrative system is of more importance than the appropriation for the payment of indemnities?

Mr. BABCOCK. Provided it is carefully figured. On the other hand, we do believe that the system should be developed with due regard for the ability of the owner of the cattle to cooperate in the expense, and it should be considered from that point of view. I am safe in making that statement here, because if we have the system the indemnities would follow.

Mr. MAGEE. Suppose you had your way as to the division of these items; how would you divide them?

Mr. SMITH. If we had $1,000,000 in the operating fund and $1,000,000 in the indemnity fund, our indemnity fund would be exhausted before the end of six months. You probably understand that last year the States appropriated about three times as much as the Federal Government for indemnity purposes, and the indemnity fund was prorated among the States, and the indemnity fund became exhausted in four months in a number of States. I would say it ought to be at least in the proportion of 2 to 1.

Mr. MAGEE. You have not cleared up the point I had in my mind. What I ask you to do is to take these figures on page 26 and tell the committee what you would have them write into the bill, taking this amount of $1,977,600 into consideration, telling us what you would recommend for administrative and operating expenses and what you would recommend for the payment of indemnities. The total amount of the estimate is $1,977,600; what proportion of that amount would you recommend to be appropriated for each of the purposes I mentioned?

Mr. BUCHANAN. Let me put the question a little differently. Suppose $1,977,600 was all the money you had from all sources, State and Federal, and that the legislative branch of the Government were called upon to provide the needed appropriation for administrative expenses and for the payment of indemnities, how would you divide that amount?

Mr. SMITH. I would say this, that it ought to be in the proportion of 2 to 1. I assume that the Bureau of Animal Industry keeps very good records on that, and the very fact that their request was for a $2,000,000 indemnity fund against $1,000,000 for operating expenses, shows the attitude of the bureau.

Mr. ANDERSON. Of course, that would depend somewhat upon the carcass value ond the general value of the animals, I suppose.

Mr. SMITH. When we get more of the meat it reduces the indemnity.

Mr. ANDERSON. It is the amount you appropriate for administrative expenses which determines how much you have to pay for indemnities.

Mr. NORGORD. The appropriation for administration sets up the system and guarantees its integrity.

Mr. ANDERSON. I know, but when the Federal Government has gone out and tested these cattle and appropriated money for doing it, naturally the people whose cattle have been tested expect to be paid the indemnity, and the Congress naturally consider that there is some moral obligation at least on the part of the Government to take care of the indemnity after the inspections have been made. So, as a matter of fact, the amount which we have to pay for indemnities is usually controlled by the amount which we provided for administrative expenses because if the cattle are not tested we do no pay indemnities and if they are tested we do.

Mr. BABCOCK. May I read a paragraph on that point?

> What is needed is the maintenance of a corps of graduate veterinarians who are mutually approved by State and Federal authorities and responsible to these officials for the reporting of disease and the proper issuance of test charts to accompany animals destined for export or interstate shipment. Such a corps is already organized, and the State should continue to make an appropriation adequate for its careful supervision and maintenance. The actual cost of making the tests by such State and Federal approved veterinarians need not become a burden on the State but may well be paid by the cattle owners concerned.

That is from a statement signed by four large farm organizations, showing their decision to back up my State on that. I would rather see the system maintained than the indemnity, but we want both, and if it costs a million dollars a year to maintain the system, which will give adequate supervision to these tests, that surely should be taken care of.

Mr. ANDERSON. That is not the way it works out. It may be that from your point of view you would rather have the system without the indemnity than have the indemnity without the system; but the fact remains that from the point of view of the Appropriations Committee the amount which is appropriated for administrative expenses in the end controls the amount which we have to pay for indemnities, because we can not very well refuse to appropriate the necessary indemnities under the agreements that the department makes on the cattle they have actually inspected and found reacting.

Mr. BUCHANAN. And condemned?

Mr. ANDERSON. Yes.

Mr. Norgord. I want to make one correction. I would say that the committee and the House have the opportunity to find out how to distribute whatever total amount is appropriated by simply getting the records of the Bureau of Animal Industry, which show the total amount of money which was used for operation and the total amount which was paid for indemnity.

Mr. Anderson. We did that last year and we were just six hundred thousand and some odd dollars out of the way. It would be impossible to tell unless we know what each State is going to appropriate for indemnity.

Mr. Smith. Here is another factor. The counties are beginning to take an interest and appropriating funds for part of the operating expenses. That necessarily reduces the burden to some extent.

Mr. Anderson. Now, does it? When the counties appropriate money I suppose it becomes a part of the fund against which the Federal Government has to appropriate, half and half. The net result of that is this—and it works both ways: We set up a system here by which we hold a bunch of hay before the mule all the time, constantly inducing the States and the counties to appropriate more money to be met with a Federal appropriation. That brings more pressure on the State legislatures for additional appropriations, until in this particular situation it has reached the point where it is reversed. If we follow out the general plan of the 50–50 proposition, it reaches a point where we do not have anything to say about what we appropriate. We appropriate according to what the State legislatures and county boards want to do. That is all right, but somebody has to have some control over the strings.

Mr. Smith. Do you not think this is of such importance that Congress ought to keep up with the demands of the people as indicated by the State appropriations? The quicker we put out the fire the less loss there will be.

Mr. Magee. The trouble there is, you can not keep up with this. There is not only one demand made upon Congress. There are innumerable demands made for innumerable other purposes. The Government could not raise money enough to meet all these demands. The question is how far we can reasonably go.

Mr. Smith. We spent $42,000,000 for the battleship *Maryland* without batting an eye.

Mr. Anderson. We batted our eyes a good deal, and we are still batting them in the Conference on Limitation of Armament.

Mr. Buchanan. We are still batting them in connection with paying our debts.

Mr. Magee. We are talking about making a $5,000,000 loan to Liberia.

Mr. Smith. We think this is of much greater consequence.

Mr. Norgord. I want to make one correction. I stated that after the accredited herds are turned back to the owners the Federal and State Governments will go on paying the indemnity. The present plan is that when the herds are turned back to the owners the Federal Government will not pay any indemnity on them any longer because of the fact that they are accredited herds.

Mr. Magee. I suppose the main idea is that eventually the burden of the work must fall upon the several States. To get the States interested it is very necessary that the Federal Government should show its willingness and its interest in cooperating with the State in this great public work. That is the way it looks to me. The Federal Government can not do everything, but the Federal Government can at least do its reasonable part, and ultimately you may get to the point you suggest, where the owner will have sufficient interest and pride in keeping his cattle free from tuberculosis to bear the expense himself.

Mr. NORGORD. That applies also to the areas.

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